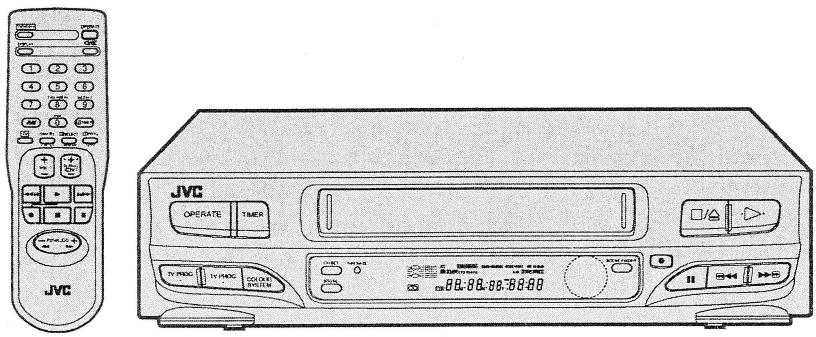
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-J227MS/J229EE



VHS
PAL NTSC

SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-J227MS)*

GENERAL

Power requirement	
Rating	: AC 110 – 240 V~, 50/60Hz
Operating	: AC 90 – 260 V~, 50/60Hz
Power consumption	: 18 W
Temperature	
Operating	: 5°C to 40°C
Storage	: –20°C to 60°C
Dimensions (WxHxD)	: 400 x 94 x 299 mm
Weight	: 3.8 kg
Format	: VHS standard
Maximum recording time	: 240 min. with E-240 video cassette (PAL/MESECAM) : 160 min. with T-160 video cassette (NTSC)

VIDEO/AUDIO

Signal system	: PAL-type colour signal and CCIR monochrome signal, 625 lines/50 fields : NTSC colour and EIA monochrome signals, 525 lines/60 fields
Recording system	: Rotary two-head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 240 lines (PAL/MESECAM) 220 lines (NTSC)
Frequency range	: 70 Hz to 10,000 Hz
Input/Output	: RCA connectors (IN x 1, OUT x 1)

TUNER/TIMER

TV channel storage capacity	: 48 positions (+ AUX position "AU")
Channel coverage	: VHF (Low) 43 – 104 MHz VHF (High) 104 – 300 MHz UHF 470 – 862 MHz
Aerial output	: UHF channels E32 – E40 (adjustable)
Programme capacity	: 1-year/8-programme timer
Memory backup time	: Minimum 3 min.

ACCESSORIES

Provided accessories	: Aerial cable, Infrared remote control unit, "R03/UM-4" battery x 2

Design and specifications subject to change without notice.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

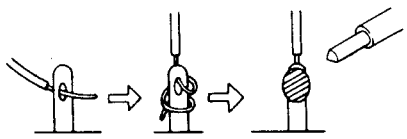

Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

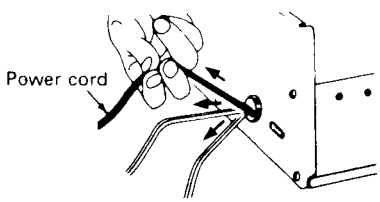

Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

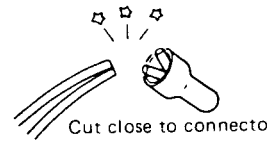

Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

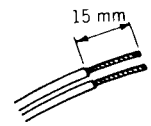

Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

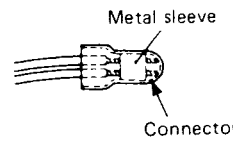

Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

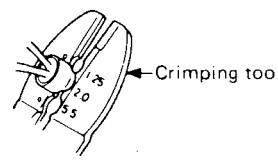

Fig. 6

(5) Check the four points noted in Fig. 7.

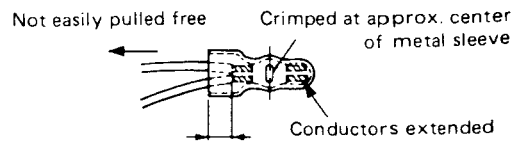
Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

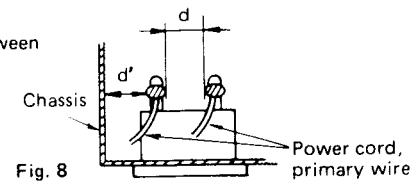

Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

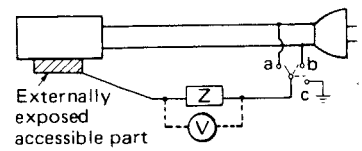

Fig. 9

5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

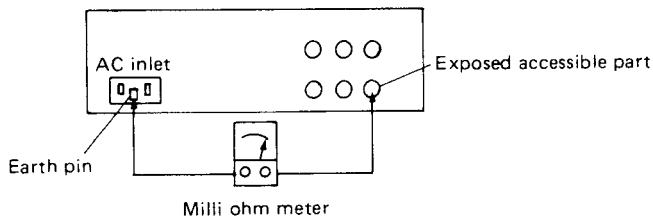

Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	—	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

Safety Precautions

The rating plate and the safety caution are on the rear of the unit.

WARNING: DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

The OPERATE button does not completely shut off mains power from the unit, but switches operating current on and off.

CAUTION
- When you are not using the recorder for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

ATTENTION
1. This recorder can also receive SECAM colour television signals for recording and playback.
2. Recordings made of SECAM television signals produce monochrome pictures if played back on another video recorder of SECAM standard, or do not produce normal colour pictures if played back on another video recorder of PAL standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.

IMPORTANT:
- It may be unlawful to record or play back copyrighted material without the consent of the copyright owner.
- Please read the "Precautions" section of this instruction manual before installing or operating the recorder.

POWER SYSTEM
This set operates on voltage of AC 110 – 240 V~ (Rating), AC 90 – 260 V~ (Operating), 50/60 Hz with automatic switching.

VHS HQ

- Only cassettes marked "VHS" can be used with this video recorder.
- HQ VHS is compatible with existing VHS equipment.

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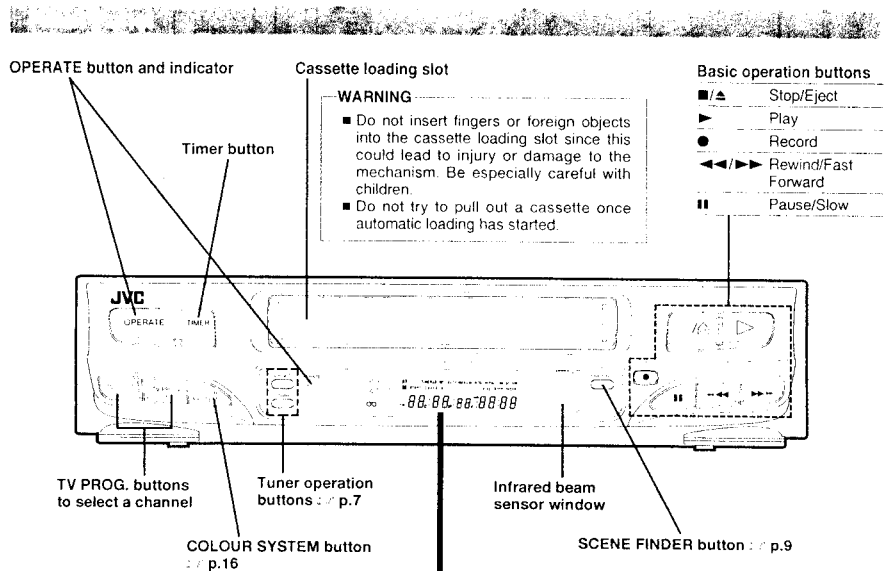
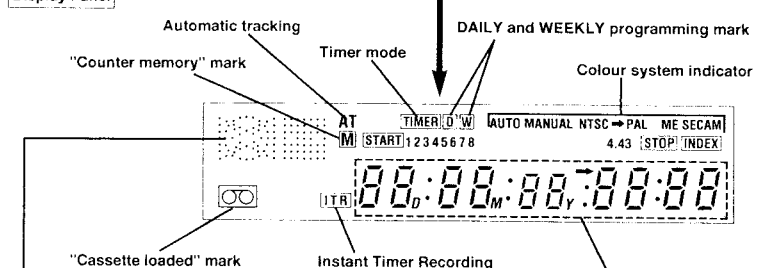
Controls And Indicators


OPERATE button and indicator
Cassette loading slot
Timer button
WARNING
■ Do not insert fingers or foreign objects into the cassette loading slot since this could lead to injury or damage to the mechanism. Be especially careful with children.
■ Do not try to pull out a cassette once automatic loading has started.
Basic operation buttons
■/⏏ Stop/Eject
► Play
● Record
◄◄/►► Rewind/Fast Forward
II Pause/Slow
JVC
OPERATE
TIMER
TV PROG. buttons to select a channel
Tuner operation buttons : ☞ p.7
COLOUR SYSTEM button : ☞ p.16
Infrared beam sensor window
SCENE FINDER button : ☞ p.9

Display Panel



Switchable display
- Channel position
- Date/Clock
- AUX indicator(AU)
- Child lock indicator
- Timer start/stop time
- Instant timer recording time
- Real channel
- Realtime tape counter
- INDEX code number

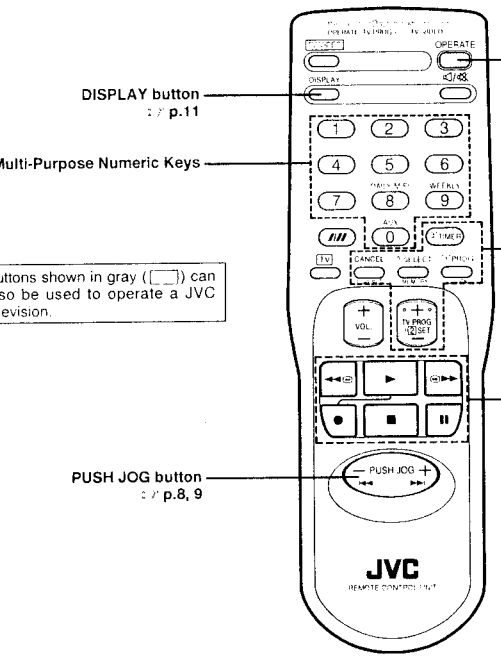
Symbolic mode indicators

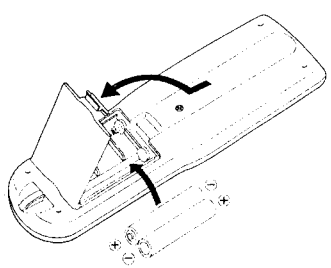
PLAY:	▷	REW VARIABLE SHUTTLE SEARCH:	◁ ◁
FF:	▷▷	STILL: FORWARD SLOW:	▷
REW:	◁◁	STILL: REVERSE SLOW:	◁
FF VARIABLE SHUTTLE SEARCH:	▷ ▷▷	RECORD:	●
REVERSE PLAY:	◁	RECORD PAUSE:	●

* The indicator will blink during Scene Finder.

Controls And Indicators (cont'd)

Wireless Remote Control





Installing Batteries

1. Open the battery compartment cover.
2. Insert 2 "R03/UM-4"-size batteries (provided) in the correct directions.
3. Replace the cover.

How To Use

The remote control can operate most of your video recorder's functions, as well as basic functions of designated JVC TV sets.

- Point the remote control toward the sensor window.
- The maximum operating distance of the remote control is about 8 m.

TV Operation

You can also use the recorder's remote control to operate a JVC television.

To operate your TV, press and hold down the TV button while you press OPERATE, or TV PROG. +/–, or TV/VIDEO, or VOL. +/–, or ▮▮▮ (to select either Main or Sub programmes), or 🔊/🔇 (to mute the TV's sound).

- TV channel cannot be changed using the numeric keys.

Connections

It's essential that your video recorder be properly connected. Follow these steps carefully. THESE STEPS MUST BE COMPLETED BEFORE ANY VIDEO OPERATION CAN BE PERFORMED.

A RECORDER-TO-TV CONNECTION

RF CONNECTION

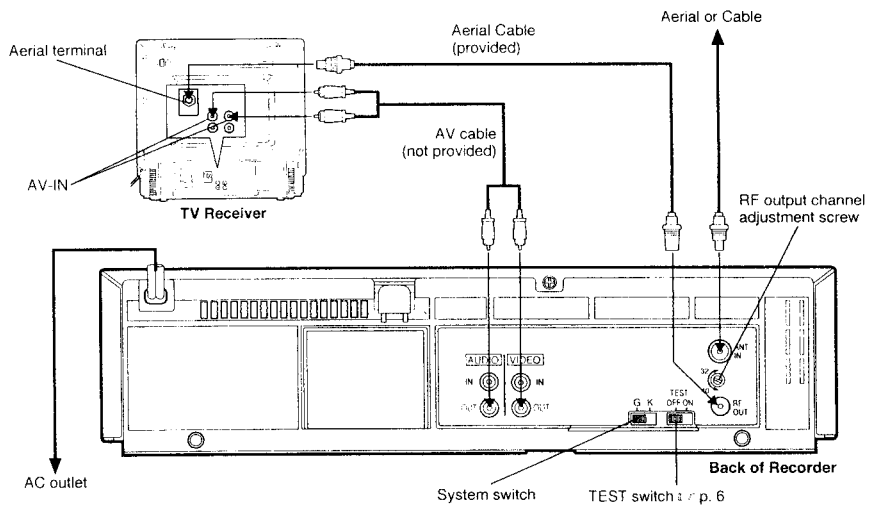
For TV sets without AV input terminals:

1. Connect the TV aerial cable to the recorder.
2. Connect the recorder to the TV's aerial terminal.

AV CONNECTION

For TV sets with AV input terminals:

1. Connect the aerial, recorder and TV as per "RF CONNECTION".
2. Connect the recorder to the TV's AV-IN terminals.



B SELECT TELEVISION SYSTEM

Set the System switch to the appropriate position according to your TV system. (Refer to the chart on the right.)

NOTE:

- If no colours appear on the screen when using a multi-system television with its system select switch set to AUTO, change the switch position to correspond to the recorder's RF system select switch (G or K).
- For more information on multi-system compatibility. ☞ p.15

Major countries	Colour TV broadcast system	Switch position
China, Mongolia	PAL D/K	K
Russia	SECAM D/K	
Kuwait, U.A.E., Indonesia, Singapore, Thailand, Malaysia	PAL B/G	G
Iran, Saudi Arabia, Egypt, Morocco, Lebanon, Iraq	SECAM B/G	

Continued on next page.

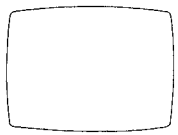
Connections (cont'd)

C ADJUST VIDEO CHANNEL

With an RF connection, the video recorder sends picture and sound signals through the connecting cable to your TV on UHF channel 36.

TEST SIGNAL

1. Turn on the recorder.
2. Set the TEST switch to ON.
3. Set your TV to the video channel. Tune to the real channel 36, to bring the two vertical white bars on the screen most clearly.

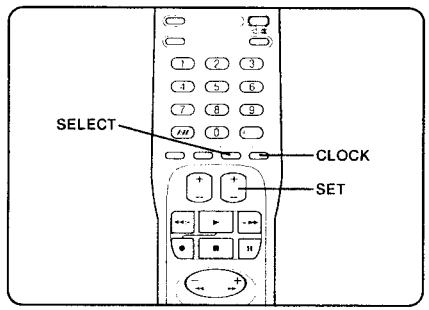


4. Your TV should be set to the channel designated for use with a video recoder or to a spare channel if there is not a specified channel.
5. Reset the TEST switch to OFF.

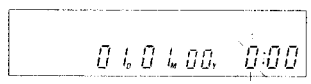
NOTE:
If some interference noise is seen on the screen because of broadcasts on neighbouring channels, adjust the RF output channel adjustment screw to change the video channel from UHF channel 36. This is possible for UHF channels 32 through 40. Consult your JVC dealer for making this adjustment.

IMPORTANT:
To operate the recorder with your TV using an RF connection, it is always necessary to set your TV's channel to VIDEO CHANNEL. With an AV connection, set the TV to the VIDEO (or AV) mode.

Setting The Clock

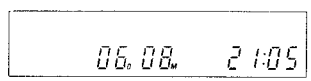


1. **Press CLOCK.**



Recorder's Display Panel

2. **Press SET to set the hour, and then SELECT.**
3. **Repeat step 2 to set the minute, day , month and year.**
4. **Press CLOCK.**



TO MAKE CORRECTIONS

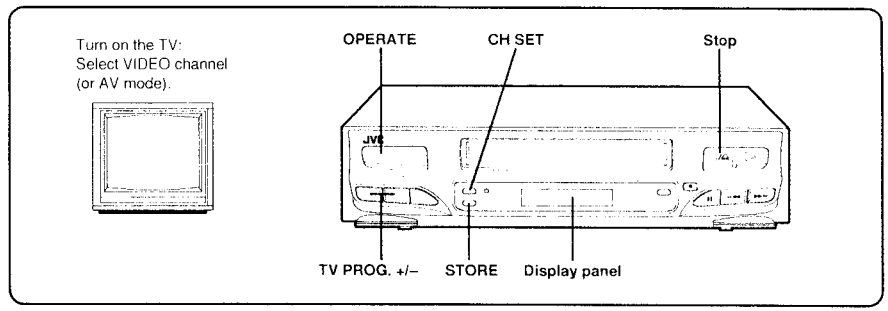
Advance with SELECT to the item you wish to change and input new data with SET.

POWER FAILURE INDICATOR

The clock resets to "0:00" and starts blinking when there has been a power failure. Reset the time to return the clock display to normal.

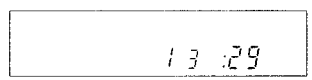
NOTE:
- If the day and month data is invalid (such as 31st April), the month digits are cleared automatically and the day digits will blink. Input again.

Setting The Tuner

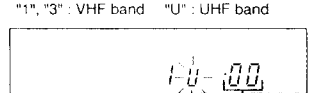


The procedure introduced here lets you assign receivable channels in your area to channel positions on your video recorder's tuner. Once stored, these can be accessed with the TV PROG. buttons.

1. **Press OPERATE to turn on the recorder.**
2. **Keep CH SET pressed until the display panel shows the following.**

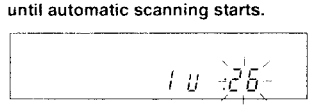


3. **Press CH SET.**
   - The band indicator will blink.
4. **Press TV PROG. +/– to select "1", "3", or "U".**
   "1", "3" : VHF band "U" : UHF band

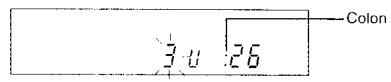


Tuning voltage giving a rough reference of where tuning is being performed in the corresponding band.

5. **Press CH SET.**
   - The tuning voltage indicator will blink.
6. **Keep TV PROG. + pressed for a few seconds until automatic scanning starts.**



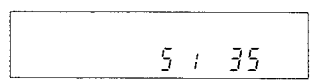
   - When a broadcast is detected, automatic scanning stops.
   - If you don't want to store the detected TV station, repeat step 6 for another station.
7. **Press CH SET.**
8. **Press TV PROG. +/– to select the tuner channel position where you wish to store that TV station.**



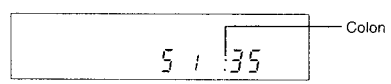
9. **Press STORE.**
   - The TV station will be stored and the colon will disappear.
10. **Repeat steps 4 through 9 for other receivable TV stations.**
11. **Press Stop on the recorder to disengage the Channel Set mode.**

TO DELETE STORED CHANNELS

1. Press TV PROG. +/– to select the channel position you want to skip.
2. Press CH SET until the display panel shows the following.

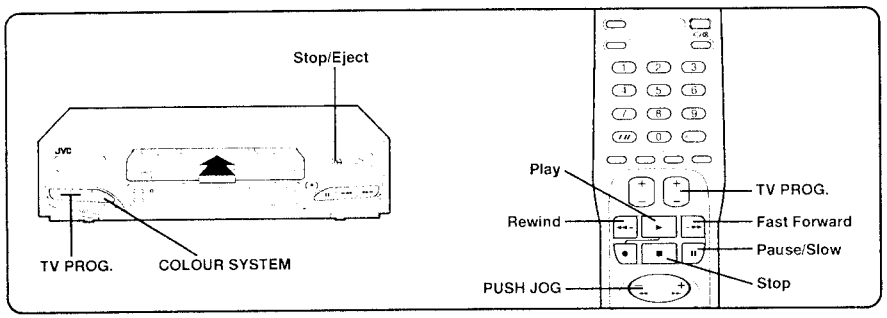


3. Press CANCEL on the remote control unit.



   - The colon will appear and channel position 5 can no longer be chosen by the TV PROG. buttons.
4. Press Stop on the recorder to disengage the Channel Set mode.

Playback



Basic Operations

Preparation

- Turn on the TV.
- Select VIDEO channel (or AV mode).

1. **Load a cassette.**
   - The recorder power will come on automatically.
   - The counter will be reset to "0:00:00" automatically.
   - If the safety tab on the cassette is removed, playback will start automatically.
   - Select the appropriate colour system by pressing the COLOUR SYSTEM button.(☞ p. 16)
2. **Press Play to start playback.**
3. **Press Stop to stop playback.**
   - To rewind the tape, press Rewind.
   - To fast-forward the tape, press Fast Forward.
   - To stop rewind or fast-forward, press Stop.
4. **Press Stop/Eject on the recorder to eject the tape.**

Variable-Speed/High-Speed Search, Still Playback/Frame Advance/Forward Slow Motion

During Playback:

- Press PUSH JOG ⏮ or ⏭ for variable-speed search.
- The more times the button is pressed, the faster the playback picture will move.
- To decrease speed, press the button for the opposite direction.
- Press Fast Forward for high-speed forward search, or Rewind for high-speed reverse search.
- For short searches, keep Fast Forward or Rewind pressed for more than 2 seconds. When released, normal playback will continue.
- Press Pause/Slow to view a still picture.
- Press again to advance the picture frame by frame.
- Press Pause/Slow for 2 seconds for slow motion.

During Still:

- For frame-by-frame playback in the forward or reverse direction, press PUSH JOG ⏮ or ⏭ in the corresponding direction.

Other Functions

Manual Tracking

Your video recorder is equipped with automatic tracking control. If you wish to adjust tracking manually, you can override this function.

During Playback:

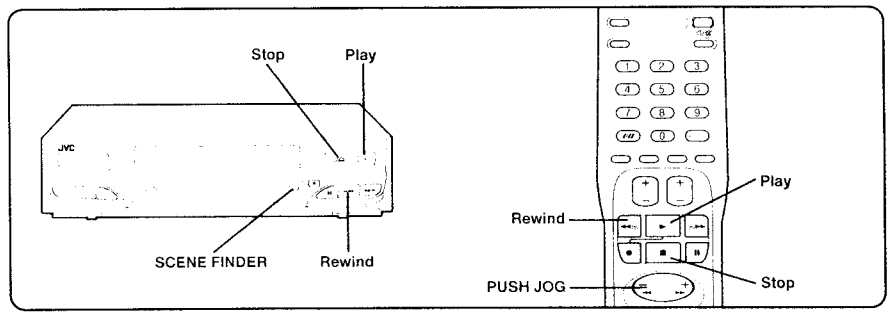
1. Press the recorder's TV PROG. + and – buttons simultaneously.
2. Press TV PROG. + or – to adjust tracking.
   - Press TV PROG. + and – simultaneously to return to automatic tracking.

During Slow:

1. Simply press TV PROG.+ or – to adjust tracking.

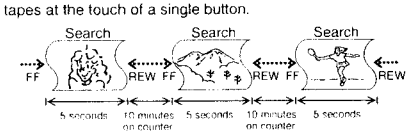
NOTES:

- The recorder automatically stops when still continues for more than 5 minutes.
- If the still picture is unstable, use the TV PROG. buttons to correct the picture.
- During search playback, some noise bars will appear.
- There is no audio during search, slow, still, or frame-by-frame playback.
- When a new tape is inserted, the recorder enters the automatic tracking mode automatically.
- To adjust tracking manually with the remote control, first press the /// button and then press TV PROG. – or +. Press the /// button again to return to automatic tracking.
- When playing back NTSC recordings in the search, still or frame-by-frame playback mode, the picture will be distorted, and there will be a loss of colour.



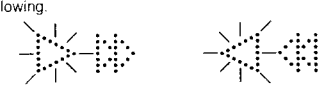
Scene Finder

This function helps you check contents of unlabeled recorded tapes at the touch of a single button.



Anytime except during Record:

1. Press SCENE FINDER.
   - The recorder starts high-speed forward search for 5 seconds and then fast-forwards 10 minutes on counter. This will be repeated until the end of the tape is reached.
   - To start Scene Finder in the reverse direction, press SCENE FINDER and then press Rewind within 2 seconds. It will be repeated until the beginning of the tape.
   - During Scene Finder, the display panel shows the following.



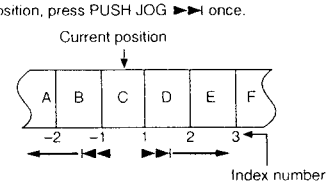
   - During Scene Finder High-Speed Search, you can also hear the tape sound. During Fast Forward (or Rewind), you will hear the current TV sound instead.
   - Scene Finder does not function during Index Search.
2. Press Stop to stop Scene Finder.

Index Search

Your recorder automatically marks index codes at the beginning of each recording. This function gives you quick access to any one of 9 index codes in either direction.

During Stop:

1. Press PUSH JOG ⏮ or ⏭. "INDEX –1" or "INDEX 1" will be displayed on the display panel and search will begin in the corresponding direction.
2. If you wish to access index codes 2 through 9, press PUSH JOG repeatedly until the correct index number is displayed.
   Ex.: To locate the beginning of B from the current position, press PUSH JOG ⏮ twice.
   To locate the beginning of D from the current position, press PUSH JOG ⏭ once.



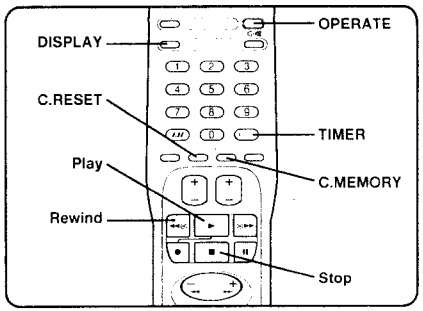
- When the specified index code is found, playback will start automatically.

Repeat Playback

During Playback:

1. Press Play for more than 5 seconds, and release.
   - The Play indicator (▷) on the display panel will blink slowly.
   - The tape will be played all the way to the end 20 times automatically, and then stop.
2. To stop playback at any time, press Stop.

Playback (cont'd)



Other Functions (cont'd)

Counter Memory

During Playback:

1. Press DISPLAY until a counter reading appears on the display panel.
2. Press C.RESET at a point you wish to locate later.
   - The counter will read "0:00:00".
3. Press C.MEMORY.
   - The M indicator will light on the display panel.
4. When you wish to return to that point, press Stop and then Rewind.
   - The tape will rewind and stop at about "0:00:00" automatically.
5. To cancel the Counter Memory mode, press C.MEMORY again.

Next Function Memory

Your recorder can memorise what to do after rewind.

During Stop:

For automatic start of playback after the tape is rewound:

1. Press Rewind.
2. Press Play within 2 seconds.

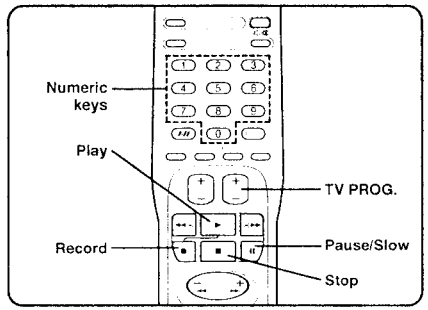
For automatic power off after the tape is rewound:

1. Press Rewind.
2. Press OPERATE within 2 seconds.

For automatic timer standby after the tape is rewound:

1. Press Rewind.
2. Press TIMER within 2 seconds.

Recording



Basic Operations

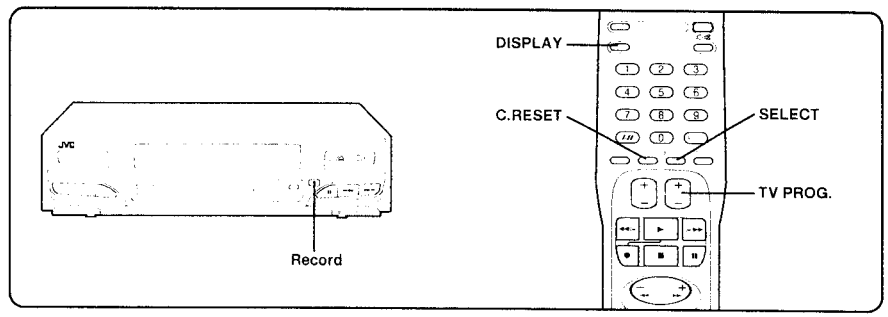
Preparation

- Turn on the TV.
- Select VIDEO channel (or AV mode).

1. **Load a cassette.**
   - The recorder power will come on automatically.
   - Select the appropriate colour system by pressing the COLOUR SYSTEM button.(☞ p.16)
2. **Press TV PROG. or the numeric keys to select the channel you wish to record.**
3. **Press Record and Play simultaneously.**
4. **Press Pause/Slow to pause recording.**
5. **Press Play to resume recording.**
6. **Press Stop to stop recording.**

NOTES:

- To start recording with the recorder's Record button, press it once on its own.
- After pause, when recording is resumed, a few frames recorded before the pause may be overlapped by the new recording. This is meant to reduce picture distortion and is not a malfunction.
- The recorder automatically stops when record-pause continues for more than 5 minutes.
- If the Record button does not work, check to see if the cassette's safety tab has been removed.
- The channel cannot be changed while recording is in progress. To change the channel, engage the record-pause mode, then change the channel.
- The recorder automatically rewinds when the end of the tape is reached during recording.



Other Functions

To Watch Another Programme While Recording

During Record:

1. Use the channel controls on the TV to select the other channel you wish to view.
   - The programme selected with the TV channel controls will appear on the TV screen while the one selected with the video recorder's channel controls will be recorded on the tape.

Instant Timer Recording (Off Timer)

You can start a recording and then set the recorder to shut off automatically after a set duration.

During Record:

1. Press recorder's Record. "ITR" and "0:30" indications appear, advising that power will switch off after 30 minutes.
2. Press Record again to delay the off-time by 30-minute increments (up to 4 hours).
   - For more precise setting, use the remote control's SELECT and TV PROG. buttons to set the exact time required (possible up to 4 hours and 59 minutes).

Elapsed Recording Time Indication

When you need to know the exact time of a recording.

1. Press DISPLAY until a counter reading appears on the display panel.
2. Press C.RESET before starting recording or playback.
   - The counter will be reset to "0:00:00" and show the exact elapsed time as the tape runs.

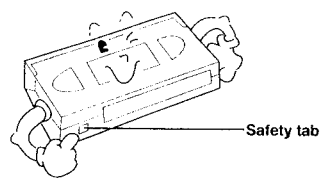
Display Button

When you wish to check the time, date, or counter reading

1. Press DISPLAY to display the current clock time.
2. Press DISPLAY again to display the current date.
3. Press DISPLAY again to display the counter reading.

Special Note On Video Cassettes

To prevent accidental recording on a recorded cassette, remove its safety tab. To record on it later, cover the hole with adhesive tape.

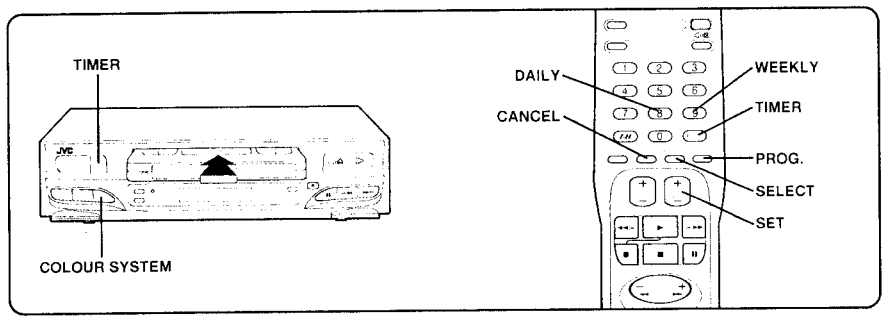


Usable Cassettes And Their Recording Times

This video recorder can record on regular VHS and Super VHS cassettes. However, it will record and play back regular VHS video signals only. It is not possible to play back a recorded Super VHS tape.

Type of Cassette	Recording/Playback Time (minutes)	Recording/ Playback System
E-240	240	PAL/MESECAM
E-180	180	PAL/MESECAM
E-120	120	PAL/MESECAM
E-90	90	PAL/MESECAM
E-60	60	PAL/MESECAM
E-30	30	PAL/MESECAM
Type of Cassette	**Recording/Playback Time (minutes)**	**Recording/ Playback System**
T-160	160	NTSC
T-120	120	NTSC
T-90	90	NTSC
T-60	60	NTSC
T-30	30	NTSC

Timer-Recording



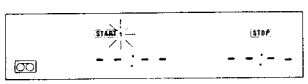
Timer programming can be done while referring to the recorder's display panel. Make sure that the display panel shows the correct current time.

Preparation

Insert a cassette with the safety tab in place.

- The recorder power will come on automatically.
- Select the appropriate colour system by pressing the COLOUR SYSTEM button. (☞ p. 16)

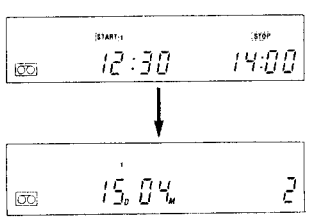
1. **Press PROG. until the display panel shows the following.**



Recorder's Display Panel

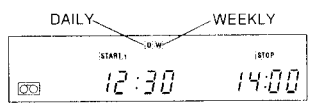
- You are ready to input data into Program No. 1.
- To change the program number, press PROG.

2. **Press SELECT.**
3. **Press SET to set the start hour and then SELECT.**
4. **Repeat step 3 to set the minute and stop time, day, month and channel.**



- The current program number will blink.
- If you need to set another program, repeat steps 1 through 4.

WEEKLY program : During steps 1 through 4, press numeric key "9" on the remote control.
DAILY (Mon. – Fri.) : During steps 1 through 4, press numeric key "8" on the remote control.



5. **Press TIMER.**
   - The recorder will enter the Timer mode and power will go off.

TO MAKE CORRECTIONS

1. Press SELECT to make the item you want to change blink.
2. Press SET to change the data.

TO CHECK AND CANCEL PROGRAMS

To check preset programs:

1. Press PROG. until the program settings are displayed.
   - Program 1 is displayed with the number blinking.
2. Press SELECT to review the program contents in succession.
3. To check another program, press PROG. again.

To cancel the program:

4. Press CANCEL.
   - You can press CANCEL at any stage while the program is open.

TO USE THE RECORDER AFTER SETTING TO THE TIMER MODE

For safety, your recorder disables all other functions while in the Timer mode.

- Press TIMER to disengage the Timer mode.
- To re-engage the Timer mode, press TIMER.

Error Indications

The following error indications may appear on the recorder when you press the TIMER button to engage the Timer Standby mode. Here's why, and what you should do.

- "TIMER" and "📼" on the display panel continue blinking.
  WHY: There is no cassette in the recorder.
  WHAT TO DO: Insert a cassette.

- The cassette is automatically ejected. "TIMER" and "📼" continue blinking.
  WHY: The inserted cassette has its safety tab removed.
  WHAT TO DO: Insert a cassette with its safety tab intact. Or cover the safety tab hole of the cassette with adhesive tape and re-insert it. ☞ p.11.

- "TIMER" blinks for 10 seconds and the Timer Standby mode is cancelled.
  WHY: There are no preset programs in memory, or they have all been incorrectly preset.
  WHAT TO DO: Check the programmed data and re-program it as necessary. Press TIMER again.

Other Indications

- "TIMER" steady lit (with clock display).
  WHY: The recorder is in the Timer Standby mode. This is the normal display you should see when you press the TIMER button.

- "◯" and "TIMER" steady lit.
  WHY: Normal display while timer-recording is in progress.

- The cassette was ejected, with power off and "TIMER" and "📼" are blinking.
  WHY: This means that the end of the tape was reached while timer-recording was in progress. Therefore, the preset program may not be recorded in its entirety.

- "0:00" blinking.
  WHY: This means the clock must be set. It's displayed when time-keeping is terminated due to a power failure or because the recorder's power plug was pulled from the AC outlet.
  WHAT TO DO: Set the clock. ☞ p.6.
- If power was interrupted, it's also likely that all preset timer programming data has been erased. Please check and re-program as necessary.

Other Functions

Locking The Recorder's Controls

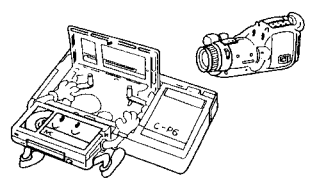
To avoid unwanted operation and prevent accidental recording...

1. Press the remote control's OPERATE button to turn the recorder's power off. Keep this button pressed for about 2 more seconds after the power LED indicator has gone off.
   - The Child Lock indicator (–) will appear on the display panel.
2. Child Lock is cancelled when you switch the recorder's power on with the remote's OPERATE button.
   - Pressing the TIMER button dunng timer-recording also cancels the Child Lock mode.

NOTES:

- While Child Lock is engaged, make sure you keep your remote control in a safe place inaccessible to children.
- Timer-recording is possible in the Child Lock mode. After timer-recording is done, Child Lock remains in effect.

To Watch A Compact VHS Tape



Compact VHS camcorder recordings can be played on your video recorder. Place the recorded cassette into a C-P6 Cassette Adapter and it can be used like any full-sized VHS cassette.

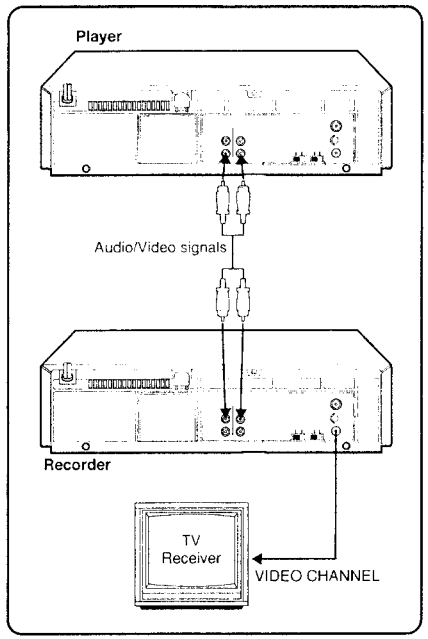
Special Note On Head Cleaning

Accumulation of dirt and other particles on the video heads may cause the playback picture to become blurred or interrupted. Although this model is equipped with a built-in head cleaner which automatically cleans the heads, reducing the likelihood of dirty heads, if such troubles are encountered please consult the nearest JVC dealer.

Auto Head Cleaner

A built-in head cleaner automatically cleans the video heads and head drum whenever a tape is loaded or unloaded to reduce head clogging.

Editing



Editing To/From Another Recorder

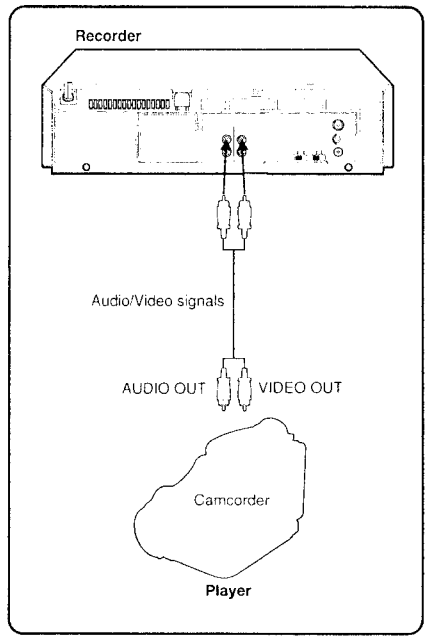
Preparation

Connect the player's AUDIO and VIDEO OUT connectors to the recorder's AUDIO and VIDEO IN connectors.

1. **Select the recorder's external input mode.**
   - With this video recorder, press the numeric key "0". "AU" will appear instead of a channel number.
2. **Put the player in the Play mode.**
3. **Put the recorder in the Record mode.**

NOTES:

- NTSC tapes being played back in the NTSC → PAL (PLAYBACK) mode (☞ p.17) cannot be dubbed to another recorder.
- When you dub an NTSC tape using your recorder as the playback deck, select MANUAL NTSC (or NTSC 4.43) with the COLOUR SYSTEM button. (☞ p.16)



Editing From A Camcorder

Preparation

Connect the camcorder's AUDIO and VIDEO OUT connectors to the recorder's AUDIO and VIDEO IN connectors.

1. **Select the recorder's external input mode by pressing numeric key "0". "AU" will appear instead of a channel number.**
2. **Put the camcorder in the Play mode.**
3. **Put the recorder in the Record mode.**

IMPORTANT:

- To edit, both the player and the recorder must be of the same colour system. Press your recorder's COLOUR SYSTEM button to select the appropriate colour system.
- PAL, SECAM and NTSC camcorders can be used as a player for editing.
- For more information on multi-system compatibility, ☞ p. 15.

Information On Multi-System Compatibility

World's Colour TV Broadcasting Systems

This recorder incorporates the circuitry necessary to record or play back PAL, SECAM and NTSC signals from most TV broadcasting systems in the world.

Multi-system compatibility

Colour System	PAL			SECAM			NTSC	
Broadcasting System	B/G	D/K	I	B/G	D/K	L*1	M*1	—
Recording & Reception System	PAL	PAL	PAL	MESECAM	MESECAM	SECAM	NTSC 3.58	NTSC 4.43*2
Major Countries	Germany, Austria, Italy, Kuwait, U.A.E., Singapore, Malaysia, Indonesia, Thailand, India, Australia	China, Mongolia, Rumania	United Kingdom, Hong Kong	Saudi Arabia, Lebanon, Iran, Iraq, Egypt, Morocco, Greece	Ivory Coast, Russia, Bulgaria, Czech Rep., Slovakia, Poland, Hungary	France	U.S.A., Canada, Japan, S. Korea, Taiwan, Philippines, Mexico	—

*1 It is not possible to receive and record SECAM L and NTSC M broadcasts with this recorder.

*2 In the case of NTSC 4.43 recordings, only tape-to-tape dubbing, by using a video cassette recorder capable of playing back NTSC 4.43 recordings, is possible.

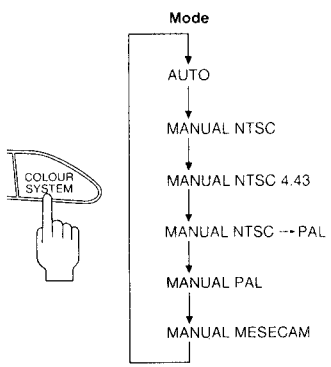
PAL, SECAM, MESECAM, And NTSC

- PAL, SECAM and NTSC are three different colour TV systems.
- MESECAM is the designation for tapes with SECAM signals that have been recorded on MESECAM-capable PAL recorders.

Information On Multi-System Compatibility (cont'd)

Setting Of The Colour System Select Buttons

■ Use the COLOUR SYSTEM button on the recorder's front panel to select the colour system. Pressing this button changes the mode as illustrated on the left. An indicator on the recorder's display panel will show which mode is selected.

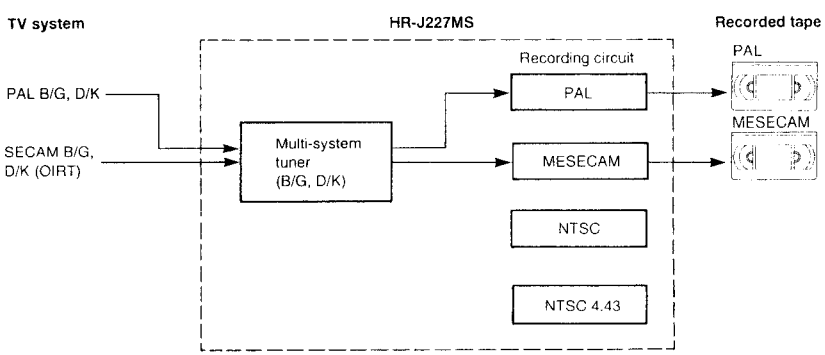


Mode Display	Description
AUTO (Colour Signal)	Usually set to this mode. This mode automatically detects PAL , NTSC, SECAM or MESECAM and adjusts to the colour system being recorded or played back. When it does not perform properly, set the colour system manually.
MANUAL (Colour Signal)	For recording, there is a choice of 4 selectable modes; PAL/MESECAM/NTSC/NTSC4.43. Select the mode that matches the colour signal being received. For playback, there is an additional mode which allows NTSC tapes to be played back and viewed on PAL TVs.

NOTES:
- In the AUTO mode, NTSC signals will be automatically recorded as NTSC.
- When playing back an NTSC tape in the AUTO mode, the NTSC→PAL(PLAYBACK) mode will be automatically selected.

Off-Air Recording

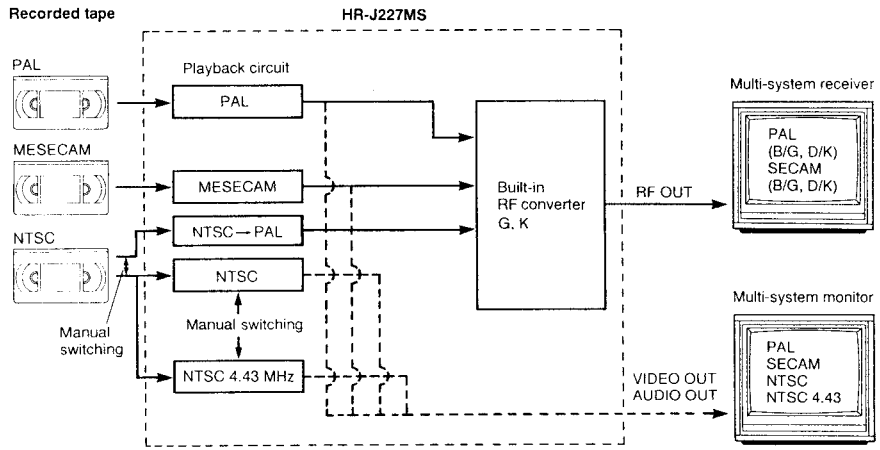
The built-in multi-system tuner is capable of receiving PAL B/G and D/K, and SECAM B/G and D/K broadcasts.



Note: This model does not operate in BRAZIL (PAL-M) or ARGENTINA (PAL-N).

Playback

This recorder can play back all 3 types of recorded tape.

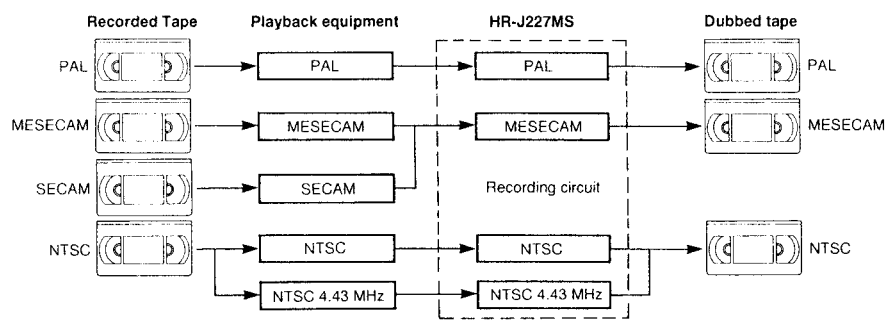


NOTES:
- When viewing NTSC tapes on a PAL TV set:
  - The picture may shrink vertically with black bars appearing at the top and bottom of the screen. This is not a malfunction on the part of the video recorder nor the TV.
  - The picture may roll up or down. This can be corrected using the V-HOLD control found on some TVs. (This cannot be corrected if the TV does not have a V-HOLD control.)
  - During search, still, or frame-by-frame playback, the picture will be distorted, and there will be loss of colour.

ATTENTION:
When this recorder is connected to a multi-system TV, it may happen that no colours appear on the screen if the colour system select switch of the TV is adjusted to the AUTO position. In such a case, change the setting of the colour system select switch of the TV to the position which corresponds to the setting (G or K) of the RF converter system select switch on the rear panel of the recorder.

Tape-To-Tape Editing

There are 4 different types of recorded tape, depending on the signal recorded.



Precautions

Please follow these safety precautions. Not doing so may result in damage to the recorder, remote control, or video cassette.

- **Avoid extreme heat and direct sunlight.**
- **Avoid extreme cold.**
- **Avoid extreme humidity.**
- **Avoid dust.**
- **Avoid places subject to vibrations.**
- **Avoid strong magnetic fields.**
- **Do not block the recorder's ventilation openings.**
- **Do not place anything heavy on the recorder or remote control.**
- **Do not place anything which might spill on top of the recorder or remote control.**
- **Do not place the recorder on cushions, pillows, or thick carpeting.**
- **Use the recorder in a stable, horizontal position only.**

When transporting

- Be sure to remove cassette from recorder before packing.
- Avoid violent shocks to the recorder during packing and transport.

Beware of moisture condensation

Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, or under extremely humid conditions — just as water droplets form on the surface of a glass filled with cold liquid. Moisture condensation on the head drum will cause damage to the tape. In conditions where condensation may occur, keep the recorder's power turned on for a few hours to let the moisture dry.

Place cassettes in cassette cases and store vertically.

ATTENTION:
This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

Specifications

GENERAL

Power requirement	
Rating	: AC 110 – 240 V~, 50/60Hz
Operating	: AC 90 – 260 V~, 50/60Hz
Power consumption	: 18 W
Temperature	
Operating	: 5°C to 40°C
Storage	: –20°C to 60°C
Dimensions (WxHxD)	: 400 x 94 x 299 mm
Weight	: 3.8 kg
Format	: VHS standard
Maximum recording time	: 240 min. with E-240 video cassette (PAL/MESECAM) : 160 min. with T-160 video cassette (NTSC)

VIDEO/AUDIO

Signal system	: PAL-type colour signal and CCIR monochrome signal, 625 lines/50 fields : NTSC colour and EIA monochrome signals, 525 lines/60 fields
Recording system	: Rotary two-head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 240 lines (PAL/MESECAM) 220 lines (NTSC)
Frequency range	: 70 Hz to 10,000 Hz
Input/Output	: RCA connectors (IN x 1, OUT x 1)

TUNER/TIMER

TV channel storage capacity	: 48 positions (+ AUX position "AU")
Channel coverage	: VHF (Low) 43 – 104 MHz VHF (High) 104 – 300 MHz UHF 470 – 862 MHz
Aerial output	: UHF channels E32 – E40 (adjustable)
Programme capacity	: 1-year/8-programme timer
Memory backup time	: Minimum 3 min.

ACCESSORIES

Provided accessories	: Aerial cable, Infrared remote control unit, "R03/UM-4" battery x 2

Design and specifications subject to change without notice.

In Case Of Difficulty

POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	■ Is the power cord disconnected? — Connect it.
Clock is functioning properly, but the recorder cannot be powered.	■ Is "TIMER" displayed on the display panel? — Press the TIMER button to extinguish the display.
Tape stops during rewind or fast-forward.	■ Is the C. MEMORY button pressed? — Press again to make "M" disappear from the display panel.

RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	■ Is a cassette loaded? ■ Is the safety tab on the cassette removed? — Reseal the slot with adhesive tape.
TV broadcasts cannot be recorded.	■ Has "AU" been selected? — Set to the desired channel.
Tape-to-tape editing or camera recording is not possible.	■ Is the camcorder or another video recorder correctly connected? ■ Are all necessary power switches turned ON? ■ Has "AU" been selected? — Set to "AU".
Timer recording is not possible.	■ Have you set the clock correctly and programmed the timer correctly? — Check once again. ■ Is "TIMER" displayed on the display panel? — If not, press the TIMER button to display "TIMER".

PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running.	■ If you are using RF OUT connection, is the TV receiver's channel selector set to the correct video channel? — Set it to the RF converter channel (UHF 36). (☞ p.6) ■ If you are using AV connection, is the TV receiver set to the AV mode? — Set it to the AV mode.
Noise appears during visual search.	■ This is normal.
Noise appears during normal or slow-motion playback.	■ Is the automatic tracking mode engaged? — Try manual tracking. (☞ p.8)
Playback picture is blurred or interrupted while TV broadcasts are clear.	■ Video heads may be dirty. — Head cleaning is necessary. Consult your JVC dealer. (☞ p.13).
Playback picture has a loss of colour.	■ Have you selected the appropriate colour system for the tape being played back ? — Select the correct colour system by pressing the COLOUR SYSTEM button. (☞ p.16) ■ Was the COLOUR SYSTEM button set to the wrong setting during recording ? — Once recorded, the signal cannot be corrected. Be sure to choose the correct setting before recording.
No sound accompanies the playback picture.	■ Is the SYSTEM switch set to the correct position? — Set it to the correct position for the TV broadcast system used in your area. (☞ p.5)

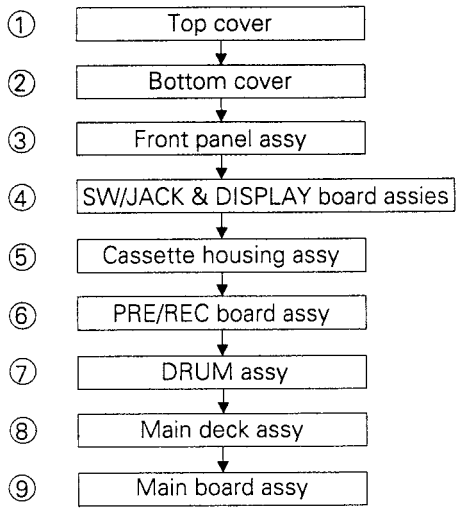
OTHERS

Symptoms	Check points
Whistling or howling is heard from TV during camera recording.	■ Move camcorder or camera's microphone away from TV or reduce TV sound volume.
Channel cannot be switched.	■ Is recording in progress? — Press the Pause/Slow button, change the channel, and press the Play button.
Remote control does not function.	■ Are the batteries discharged? — Replace with new ones.

SECTION 1
DISASSEMBLY

1.1 DISASSEMBLY FLOW CHART

This flowchart shows lists the disassembly steps for the cabinet parts and P.C. boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in order. Bend,route and dress the flat cables as they were originally.



1.2 HOW TO READ THE DISASSEMBLY AND ASSEMBLY

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	5(S1)	
②	BOTTOM COVER	D2	(S2), 9(L1), 2(P1)	
③	FRONT PANEL ASSY	D3	7(L2)	<NOTE 1>
④	SW/JACK & SW/DISPLAY BOARD ASSIES	D4	12(L3),*CN1, *CN2	<NOTE 2>
⑤	CASSETTE HOUSING ASSY	D5	4(S3)	<NOTE 3>
⑥	PRE/REC BOARD ASSY	D6	2(S4),*CN1 *CN201,*CN202 SHIELD CASE	

(1) (2) (3) (4) (5)

(1) Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order. These numbers are also used as the identification (location) NO. of parts Figures.
(2) Part name to be removed or installed.
(3) Fig.No. showing procedure or part location
(4) Indentification of part to be removed,unhooked,unlocked, released,unpluged,unclamped or unsoldered. P = Spring, W = Washer, S = Screw, L = Locking tab, * = Unhook,unlock, release,unplug or unsolder.
(5) Adjustment information for installation

1.3 DISASSEMBLY/ASSEMBLY METHOD

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	5(S1)	
②	BOTTOM COVER	D2	(S2), 9(L1), 2(P1)	
③	FRONT PANEL ASSY	D3	7(L2)	<NOTE1>
④	SW/JACK & DISPLAY BOARD ASSIES	D4	13(L3),*CN1	<NOTE2>
⑤	CASSETTE HOUSING ASSY	D5	2(S3), 2(S7)	<NOTE3>
⑥	PRE/REC BOARD ASSY	D6	2(S4),*CN1 *CN201,*CN202 SHIELD CASE	
⑦	DRUM ASSY	D7	3(S5),WR1,(L4), 4(L5) INERTIA PLATE HEAD CLEANER	<NOTE4>
⑧	MAIN DECK ASSY	D8	2(S6),WR2 WR3,2(L6)	<NOTE5>
⑨	MAIN BOARD ASSY	D9	3(L7)	

<NOTE1>
When reattaching the front panel assy, make sure that the door opener of the cassette housing assy is lowered in position prior to the reinstallation.

<NOTE2>
When plugging the connector in, check that the flat wire is inserted properly and fully.

<NOTE3>
When reattaching the cassette housing assy, pay careful attention to the switch lever not to make it touch the REC switch knob of the MAIN board assy from the upside.
(If the REC switch knob of the MAIN board assy is damaged, cassette loading is impossible.)

<NOTE4>
When plugging the connector in, check that the flat wire is inserted properly and fully.

<NOTE5>
- When removing the Main deck assy only, unhook the two spacers connecting it with the Main board assy with pliers from the back side of the Main board assy first, and then remove the Main deck assy.
- When reattaching the Main deck assy to the Main board assy, make sure to set the spacers into the retaining slots respectively.

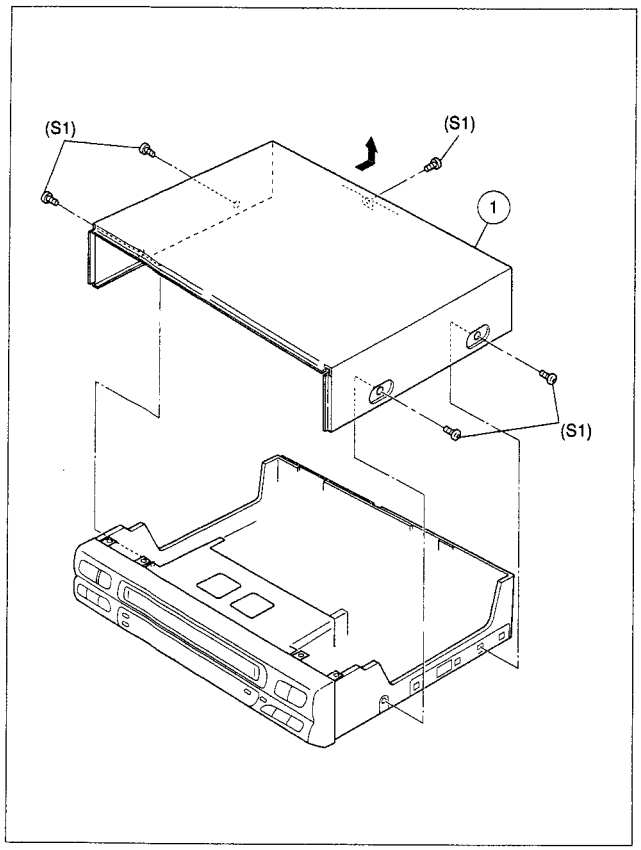


Fig. D1

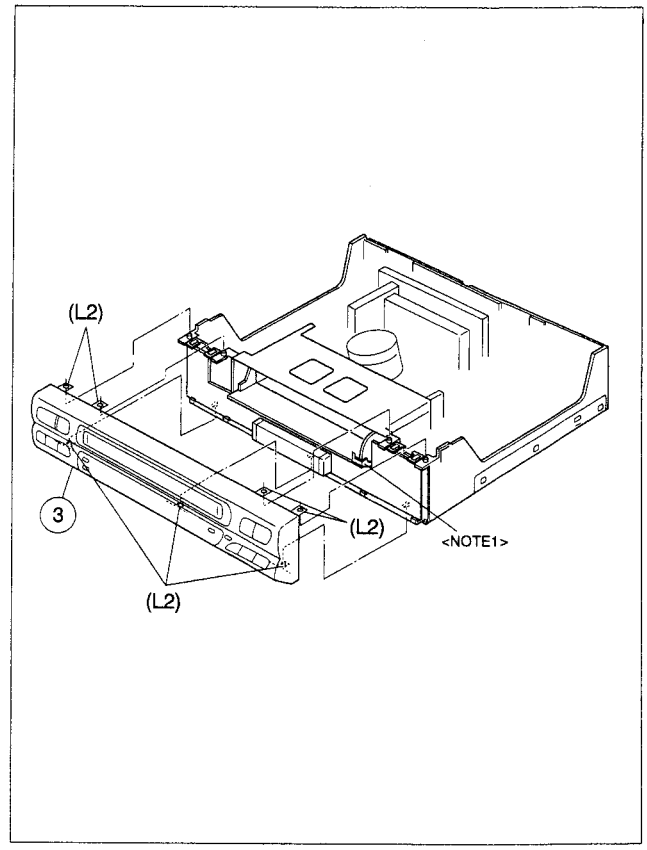


Fig. D3

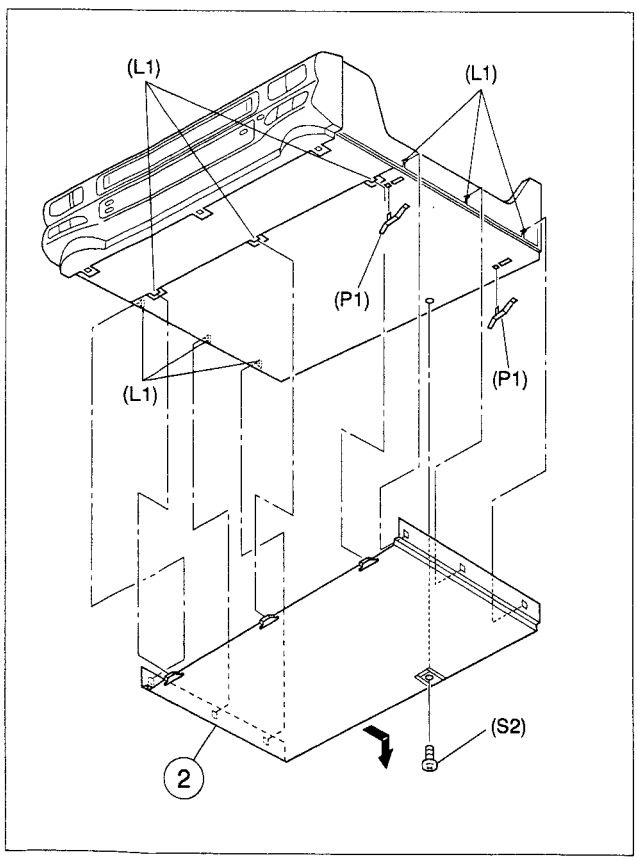


Fig. D2

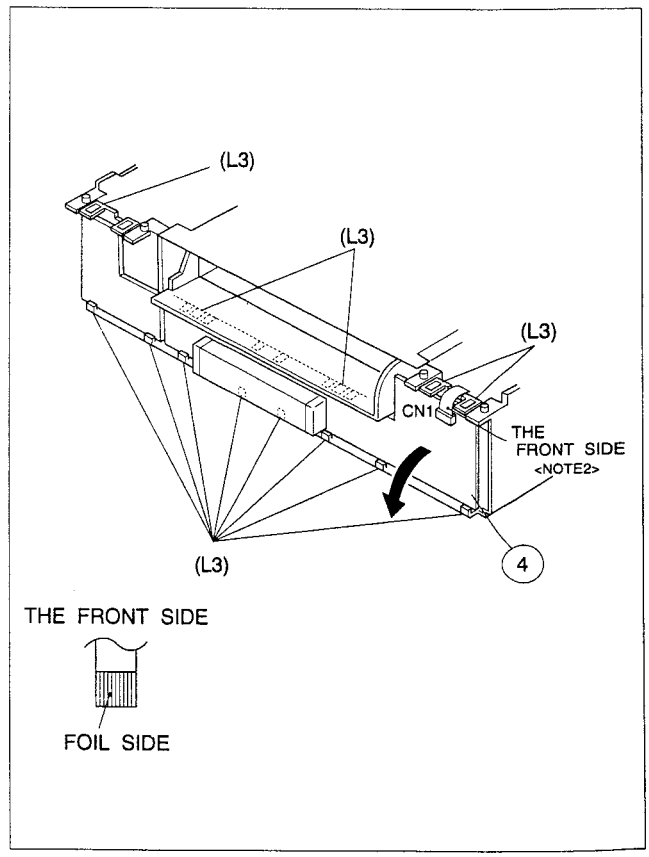


Fig. D4

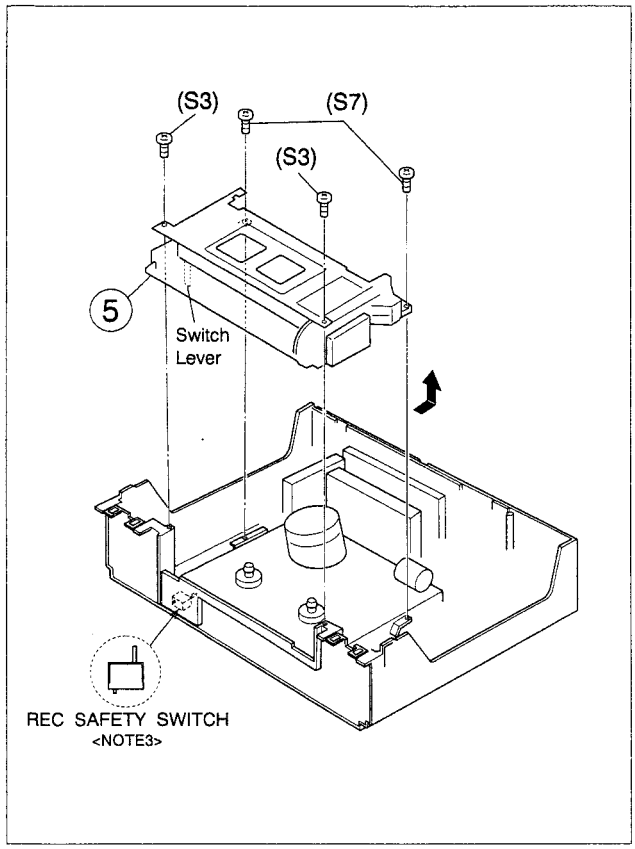


Fig. D5

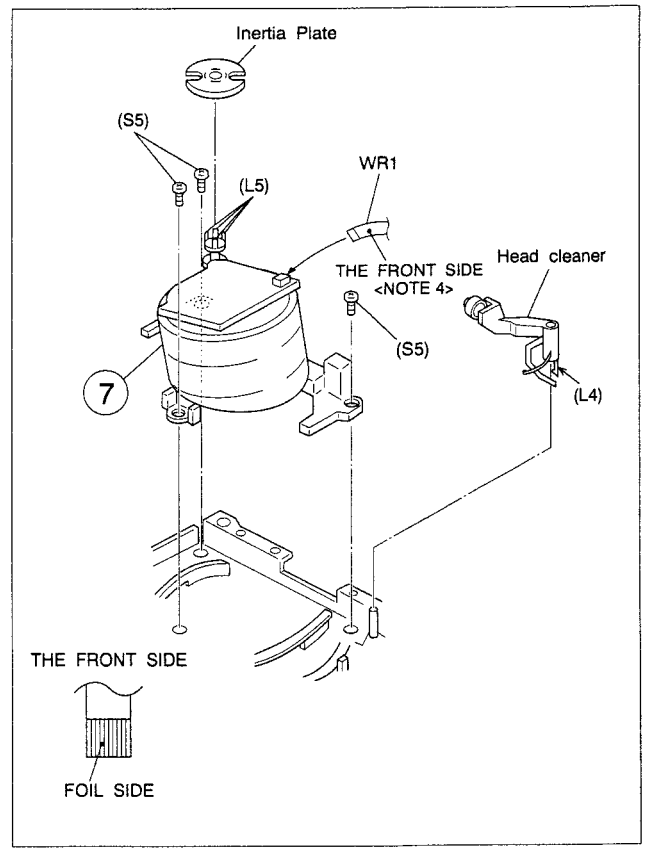


Fig. D7

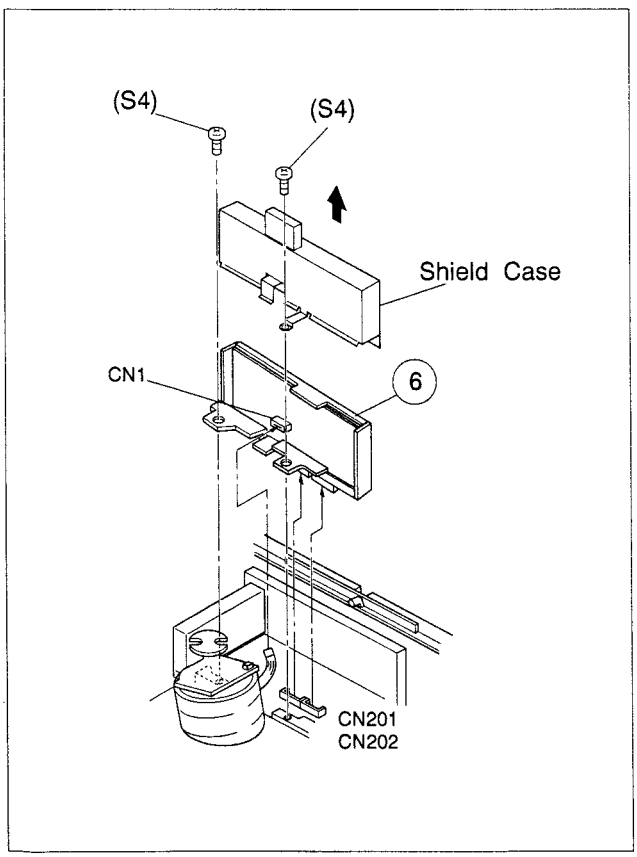


Fig. D6

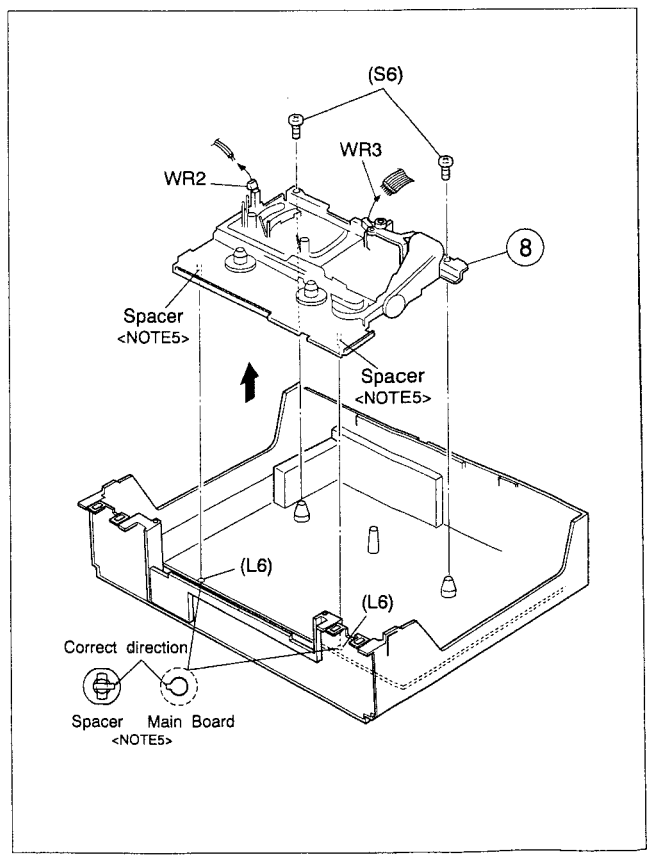


Fig. D8

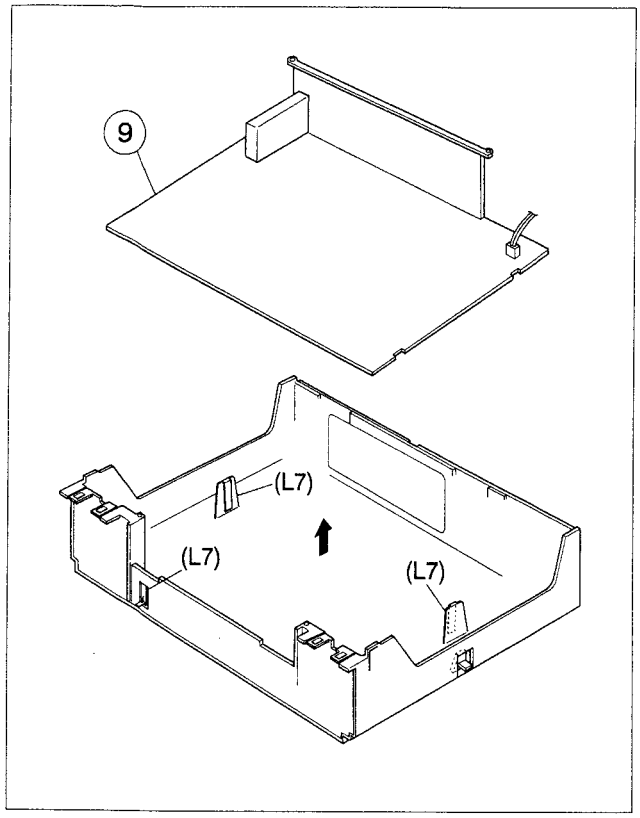


Fig. D9

1.4 CASSETTE HOUSING INSTALLATION

NOTE: *Observe the mechanical phase and position (see figure) when installing the cassette housing assembly. If these are incorrect, the system will not operate properly even when tape is inserted.*

1. Check that the hole of the control cam are aligned to the deck hole. If necessary, turn the mode motor belt by hand to adjust the position.

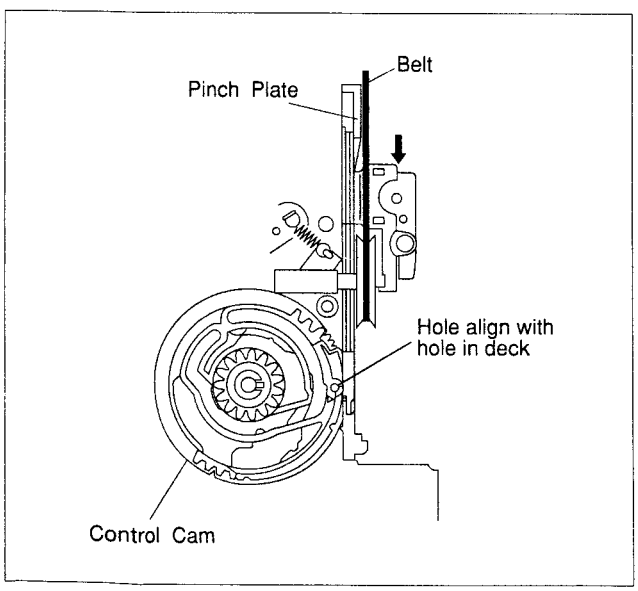


Fig. 1-4-1

1.5 SERVICE POSITION

1.5.1 How to take out the Mechanism and Main board assemblies.

(1) Remove the Top cover, Front panel assy and CN1 of the DISPLAY board assy.
(2) Take out 2 screws (A) and 2 screws (B) as shown in Fig.1-5-1.

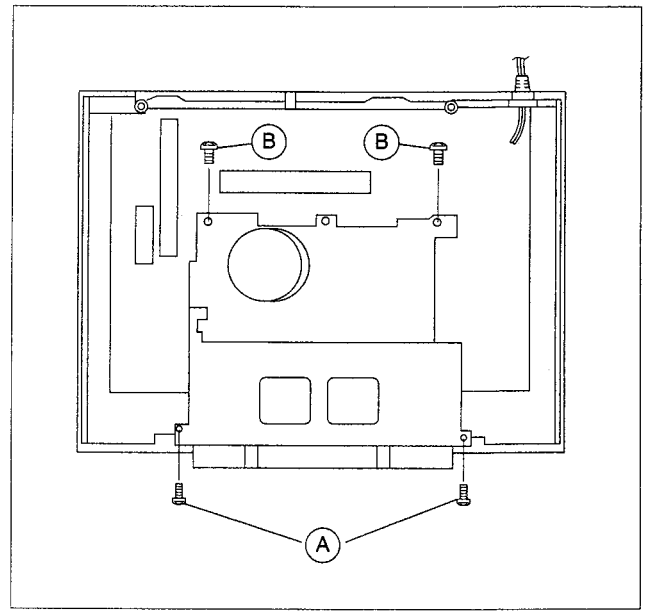


Fig. 1-5-1

(3) Disengage 3 claws (a) from the chassis.
(4) Remove the Mechanism assy (including Cassette housing) and Main board assy out of the chassis as shown in Fig. 1-5-2.

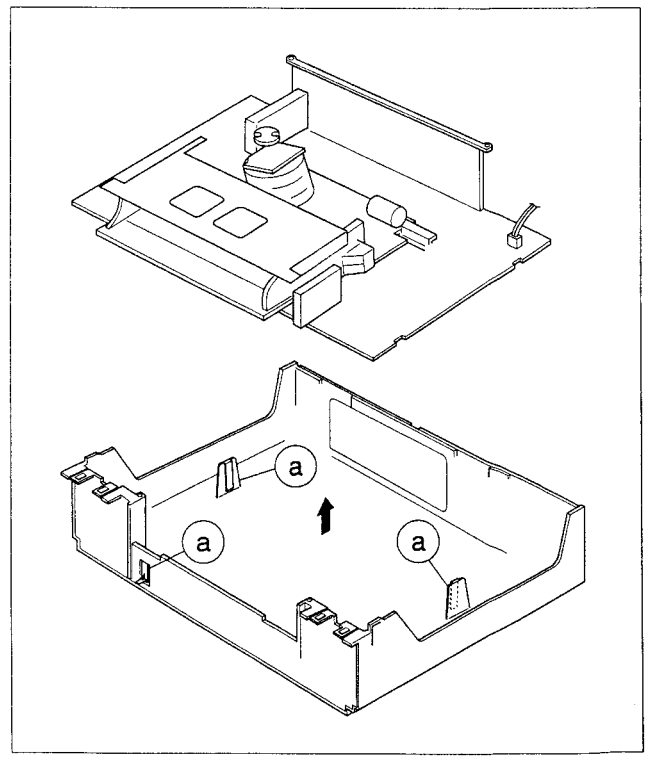


Fig. 1-5-2

(5) Turn over the Mechanism assy and Main board assy then connect CN1 of the DISPLAY board assy.
(6) Carry out checks & repairs as necessary as shown in Fig.1-5-3.

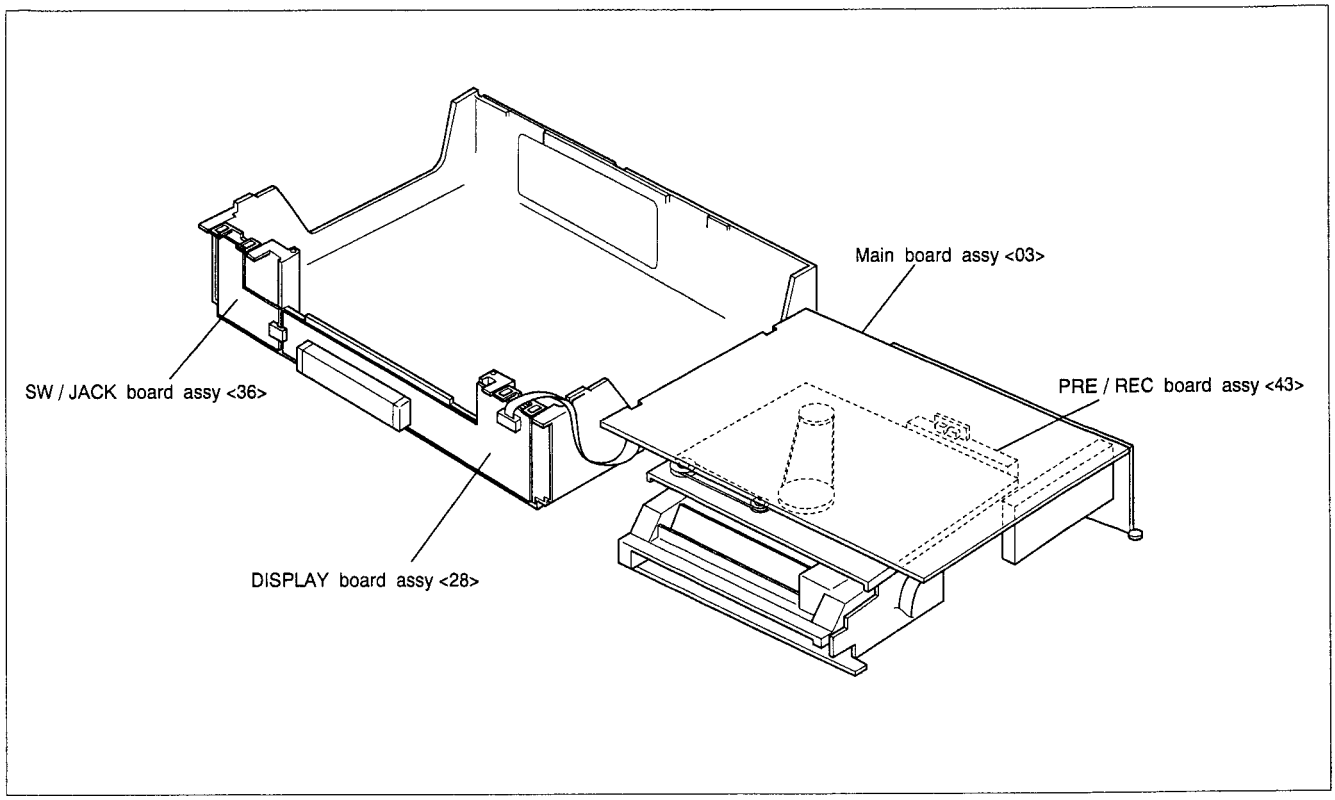


Fig. 1-5-3

1.5.2 Opening on the chassis.

The chassis assy has openings for easy access to the check-points and connector pins as shown in Fig.1-5-4.

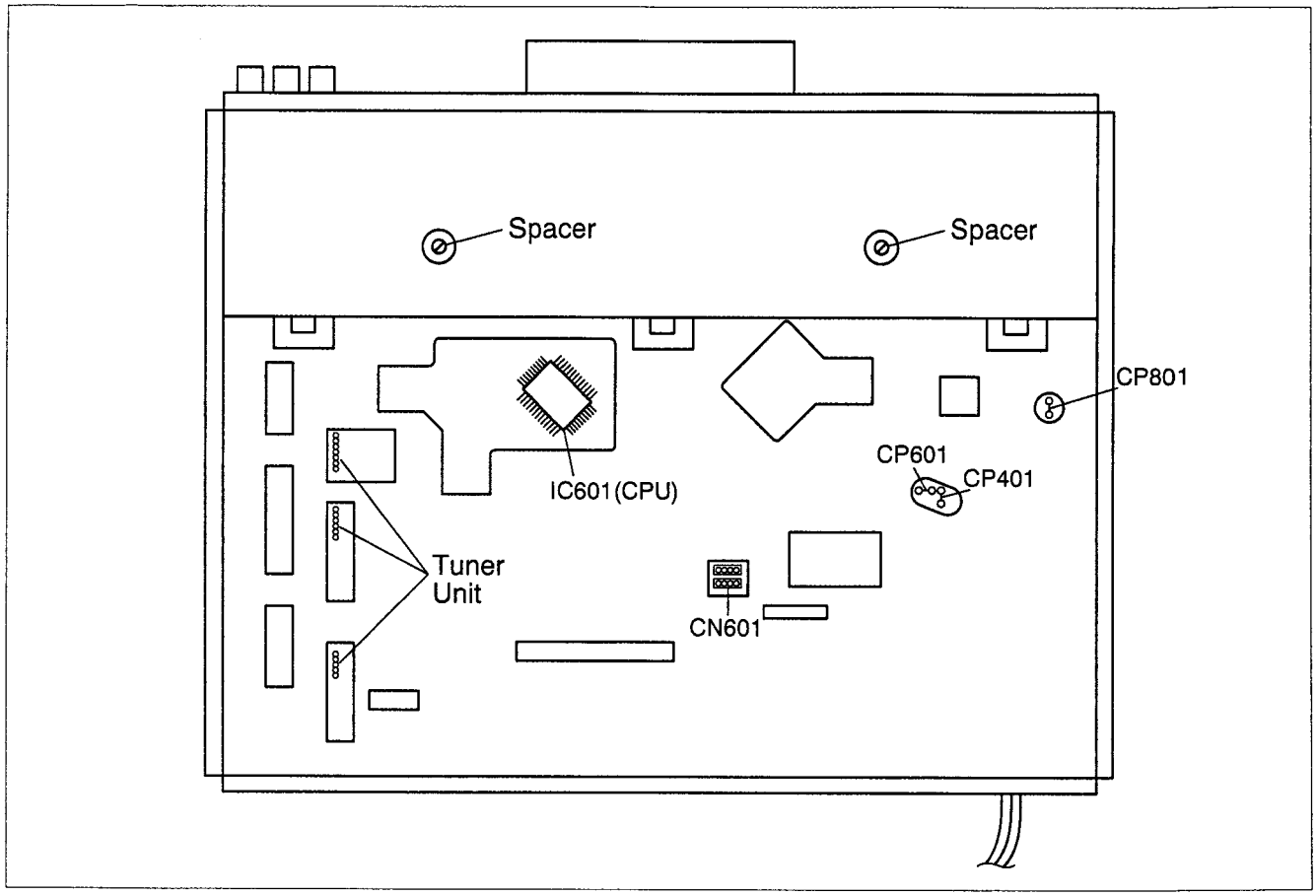


Fig. 1-5-4

1.6 MECHANISM SERVICE MODE

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "MECHANISM SERVICE MODE".

1.6.1 How to set the "MECHANISM SERVICE MODE"

(1) Disconnect VCR from AC.
(2) Remove the Top cover, Front panel assy and cassette housing assy. (See Page 1-2, 1-3)
(3) Connect TP2 (GND) and TP1 (TEST) on the DISPLAY board assy with a jump wire.
(4) Connect VCR to AC.
(5) Press the POWER button.
(6) Select the desired operation modes with the operation buttons or remote controller.

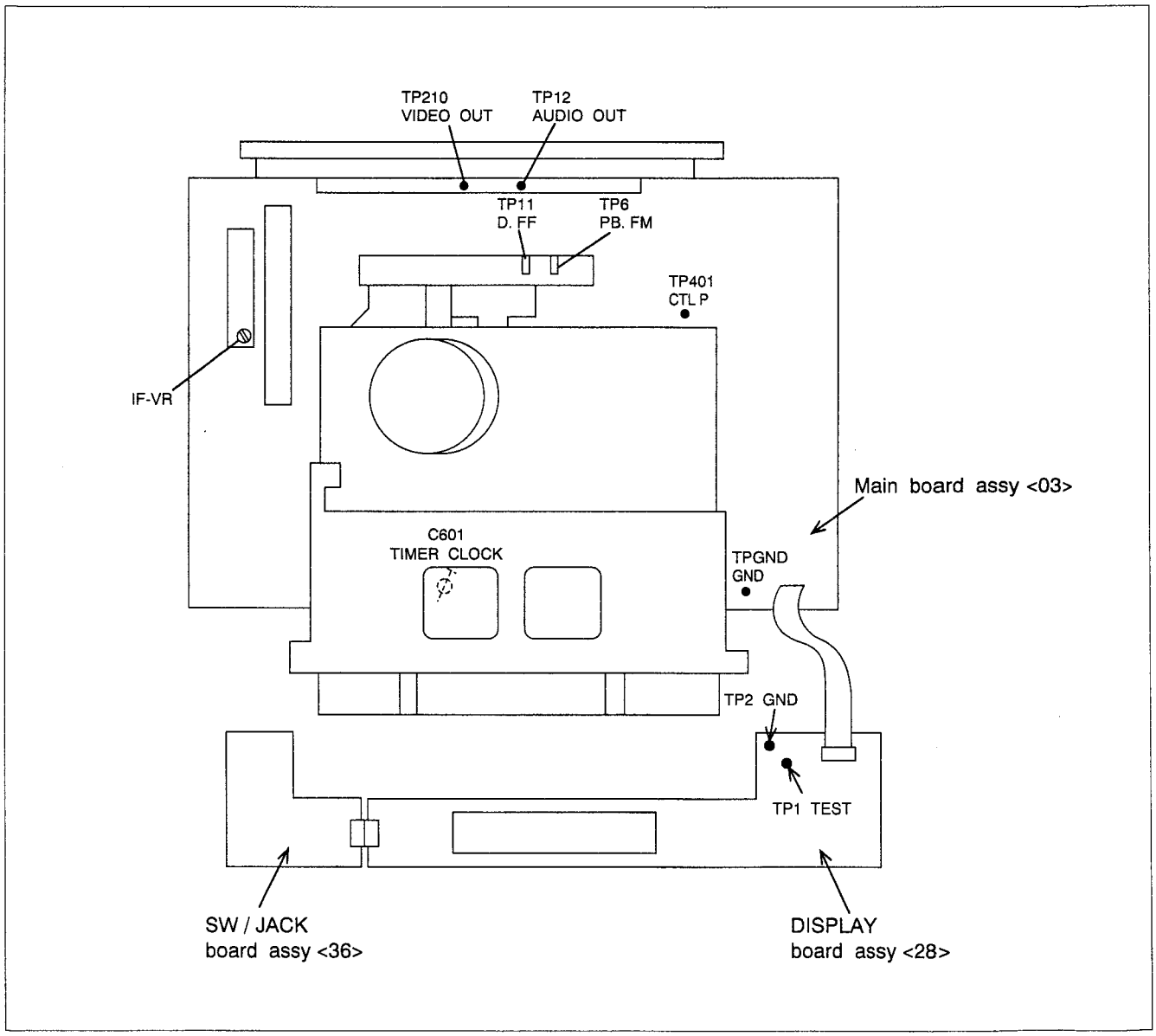


Fig. 1-6-1

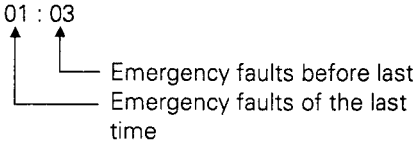
1.7 EMERGENCY DISPLAY FUNCTION

This product has the function to store the last two previous emergency faults which can be displayed in the FDP when servicing.

1.7.1 How to display record of an emergency faults

(1) Press "N" button of the presetting unit more than 2 seconds. and the two previous emergency faults are shown in the FDP.
(2) Press "N" button of the presetting unit again when return the normal mode.

[Example] E : 01 : 03



[Example] E : — — : — — ← No record of emergency

1.7.2 Detail of emergency faults

FDP	Symptom	Detect mode	Resulting mode
E : 01	Loading motor rotates for more than 8 Sec without shift to next mode.	Loading	POWER OFF
E : 02	Loading motor rotates for more than 8 Sec without shift to next mode.	Unloading	POWER OFF
E : 03	TU REEL FG input is absent (for more than 4 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 04	DRUM FF input is absent (for more than 3 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP
E : 06	CAPSTAN FG input is absent (for more than 1 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 07	No SWD5V/12V	POWER ON	POWER OFF

Table 1-7-1 EMERGENCY FAULTS

1.7.3 How to clear emergency record

Press the COUNTER RESET button on the remote controller in the emergency record display mode,and the record of the emergency fault(s) is cleared.

SECTION 2
MECHANISM ADJUSTMENT

2.1 PREPARATION

2.1.1 Precautions

(1) Disconnect VCR from AC power before soldering.
(2) Avoid imparting stress to wires when disengaging connectors.
(3) Determine and correct the cause of difficulty before proceeding to adjustments.Do not disturb settings unnecessarity.
(4) Use care not to damage tabs,claws,etc during repairs.
(5) Install the cassette housing assy only when the mechanism is in the MECHANISM ASSEMBLING MODE position.
(6) When installing the Front panel assy,be sure to engage the housing door with the door opener of the cassette housing assy.
If this is omitted,the cassette door will not open at Eject and the cassette can not be removed. (See SECTION 1 DISASSEMBLY.)

2.1.2 Check without cassette housing assy.

Mechanism operations can be observed easily by removing the cassette housing assy. Use the MECHANISM SERVICE MODE (See SECTION 1 DIASSEMBLY)

2.1.3 Manual removal of loaded tape

When the deck enters the emergency mode with cassette tape loaded and it can not be ejected by pressing the EJECT button,take out of the cassette tape according to the following procedure.

(1) Disconnect the power cord from AC outlet then take out the Top cover and Front panel assy.
(2) Turn the mode motor on the Main deck assy by hand in the unloading direction to where the pole base assy (supply and take-up) is positioned below the cassette tape.At that time, pay careful attention to the tape not to get soiled with grease.
(3) Take out 4 screws of the cassette housing assy.(See SECTION 1 DISASSEMBLY)
(4) Remove the cassette housing with slackened tape and guard panel of cassette.
(5) Wind up the tape by turning the reel hub(either supply or take-up side for convenience) from the bottom of the cassette,and remove the cassette tape.

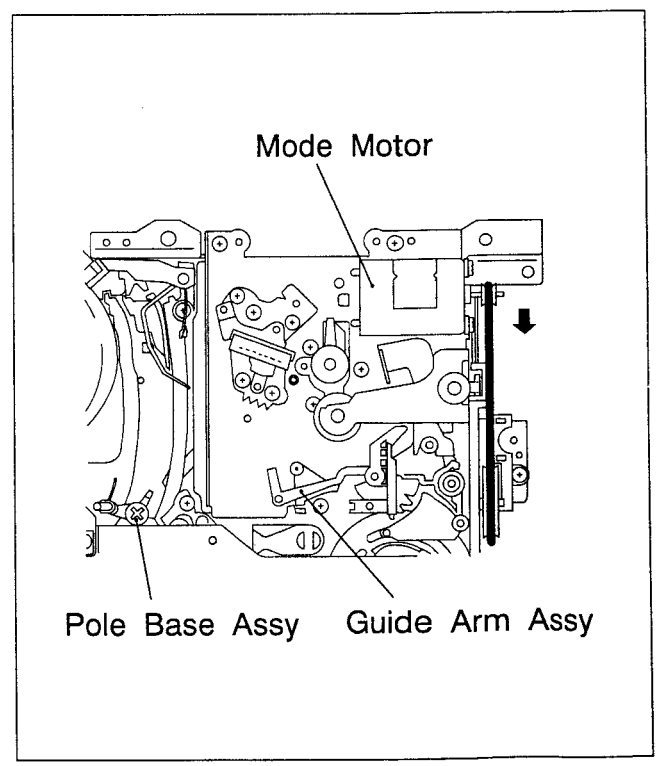


Fig. 2-1-1

2.1.4 Test Equipment

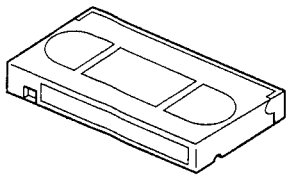
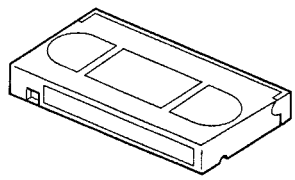
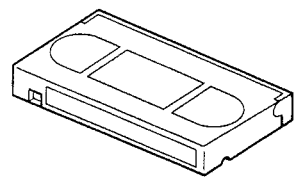
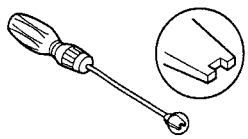
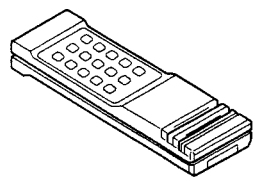
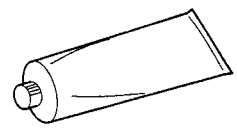
Alignment tape (SP) MHPE	Alignment tape (EP) MHPE-L	Back tension cassette gauge PUJ48076-2	A/C head positioning tool PTU94010
			
Roller driver PTU94002	Presetting unit PTU94008	Grease KYODO-SH-P	
			

Table 2-1 Test equipment

2.2 MAIN MECHANISM PARTS

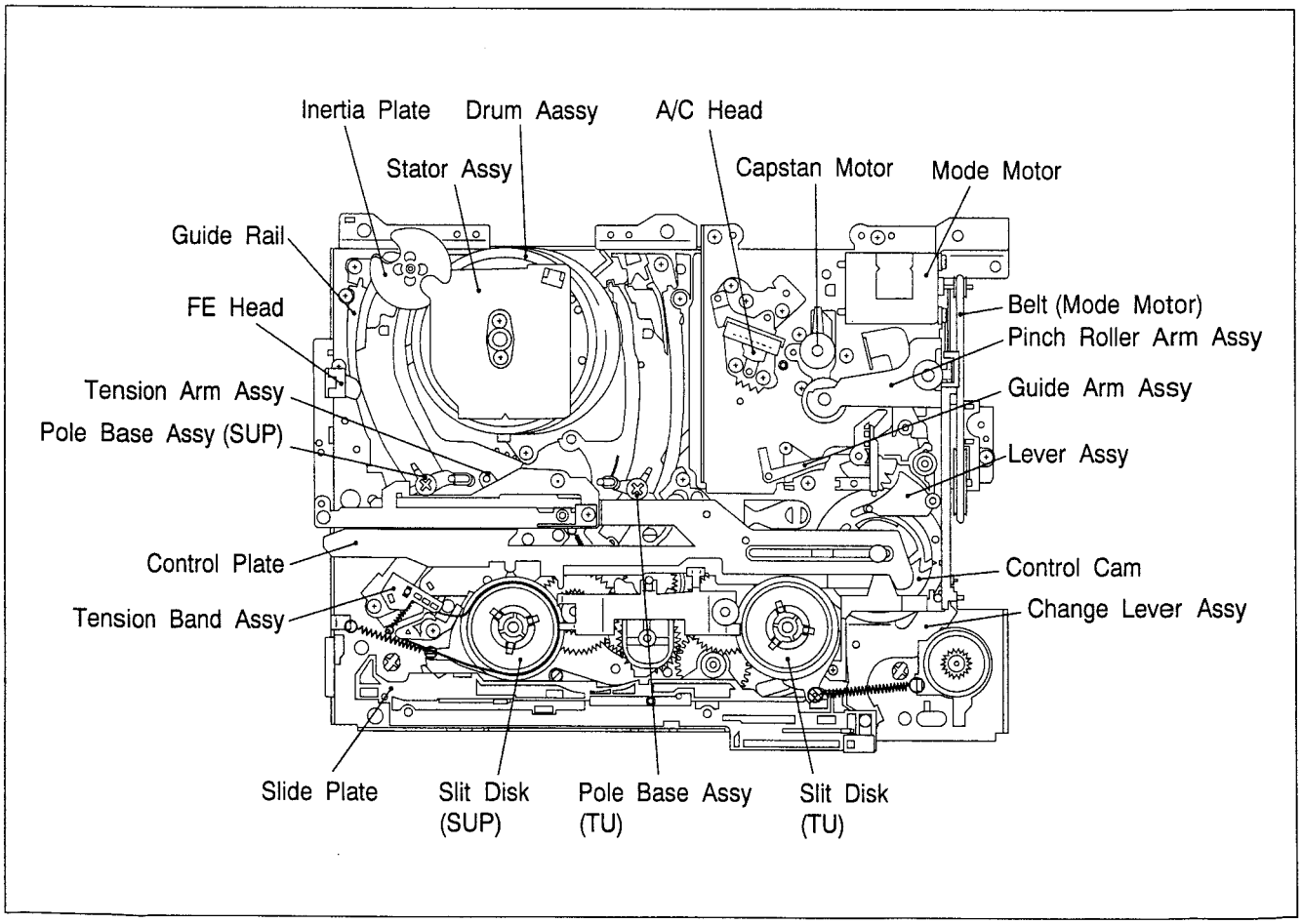


Fig. 2-2-1 Top view of main deck

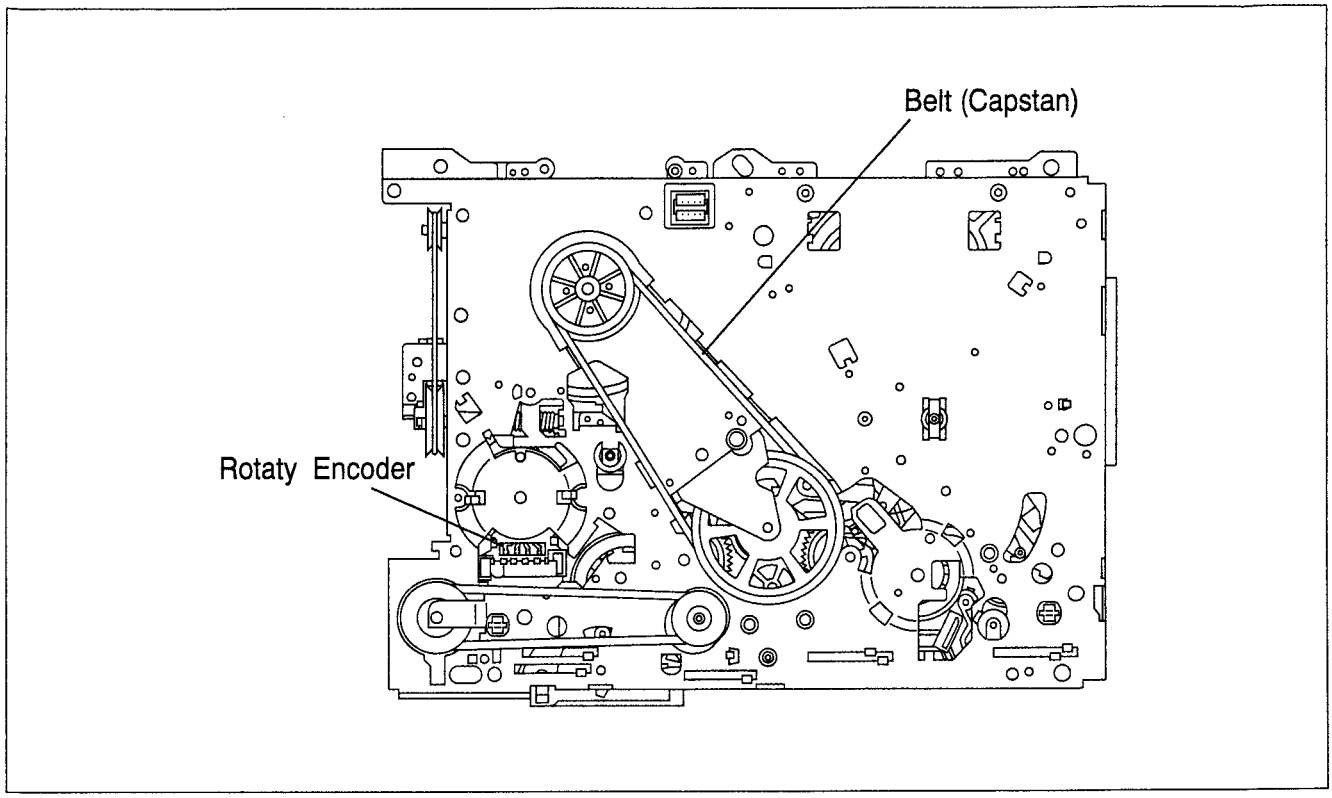


Fig. 2-2-2 Bottom view of main deck

2.2.1 Cleaning

Periodic cleaning of the tape transport system is desirable,but ordinarity not feasible in practice.Therefore,perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads,tape guides and brush can detract from playback picture quality and in extreme cases,even damage the tape.For cleaning,use a finemesh cotton cloth(about the texture of a while dress-shirt) moistened in alcohol. It is recomended to also clean thetape tension posts and capstan.

- To clean the video heads,press the moistened cloth gently against the upper drum with fingertip and turn the drum gy hand.
- Do not use a vertical stroke,as this may damage the heads.

2.2.2 Lubrication

Oil and grease do not normally require periodic replenshing. Apply only when replacing lubricated parts(also clean and replace lubrication of mating parts if soiled). For parts and points to apply oil and grease, refer to the exploded views of the mechanism assy. Before oiling,clean with alcohol.Apply one or two drops of oil. Avoid excess oil.

1. Table 2-2-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	COSMO-HV56
Grease	KYODO-SH-P

Table 2-2-1

2. Grease is not required for a replacement cassette housing assy,as this has been applied at the factory.

NOTE : *Stir grease that has been stored for an extended period.*

2.3 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage.Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced as and when required.

2.3.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning,lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions.However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time,even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assy	★ ○	○
	A/C head	★ ○	★ ○
	Lower drum motor assy	★	★ ○
	Pinch roller arm assy	★	★
	Full erase head	★	★
	Tension arm assy	★	★
	Guide arm assy	★	★
Drive	Capstan motor		○
	Belt (Capstan)	○	○
	Belt (Mode motor)		○
	Mode motor		○
	Slit disk (supply, take-up)		○
	Clutch unit (supply, take-up)		○
	Worm gear assy		○
	Control plate		○
	Slide plate		○
Other	Brush assy	★ ○	★ ○
	Tension band assy	○	○
	Rotary encoder		○

★ : Cleaning
○ : Inspection or Replacement if necessary

Table 2-3-1

2.4 DISASSEMBLY/ASSEMBLY PROCEDURE OF MECHANISM

2.4.1 Precaution before disassembling mechanism

This mechanism has an exclusive operation mode provided for disassembling and installation of the mechanism (MECHANISM ASSEMBLING MODE), and it is suggested to set the mechanism to this mode before disassembly and installation.The exclusive mechanism operation mode is not generally used and becomes available by manual setting only. Then this procedure starts with the condition that the cabinet parts,cassette housing assy and PRE/REC board assy have been removed.

2.4.2 How to set the exclusive mechanism operation mode (MECHANISM ASSEMBLING MODE)

(1) Turn the mode motor belt by hand.
(2) Confirm that the hole of the control cam are aligned to the deck hole as shown in Fig.2-4-1.

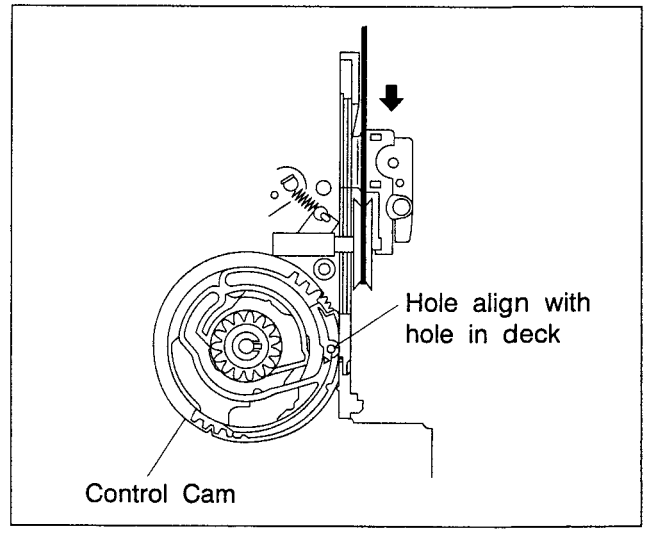


Fig. 2-4-1

2.5 MAIN PARTS REPLACEMENT OF MECHANISM

2.5.1 Pinch Rollar Arm ASSY

(1) Remove the slit washer.
(2) Tilt up the pinch rollar assy in direction of arrow.

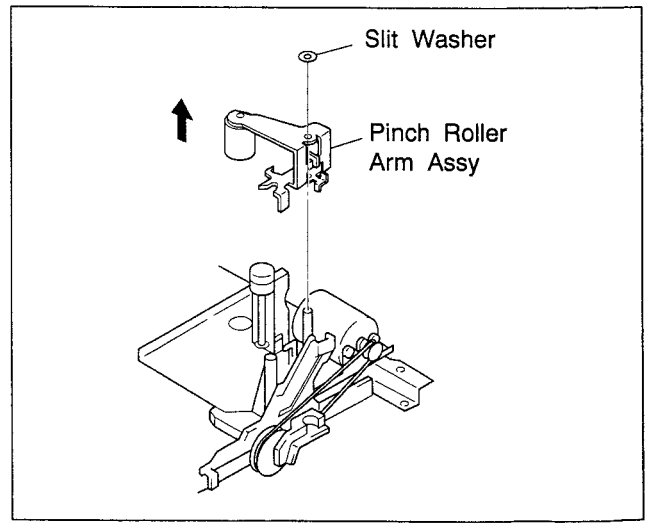


Fig.2-5-1

2.5.2 A/C Head

1. Removal

(1) Take out 2 screws (A).

(2) Remove the A/C head with head base.

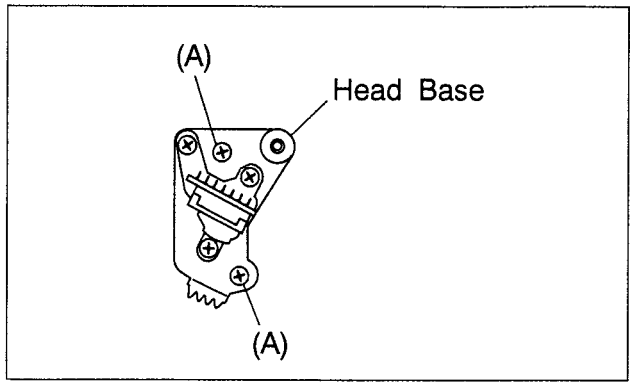


Fig.2-5-2

(3) When replacing the A/C head only,remove 3 screws (B), use care not to misplace the 3 springs.

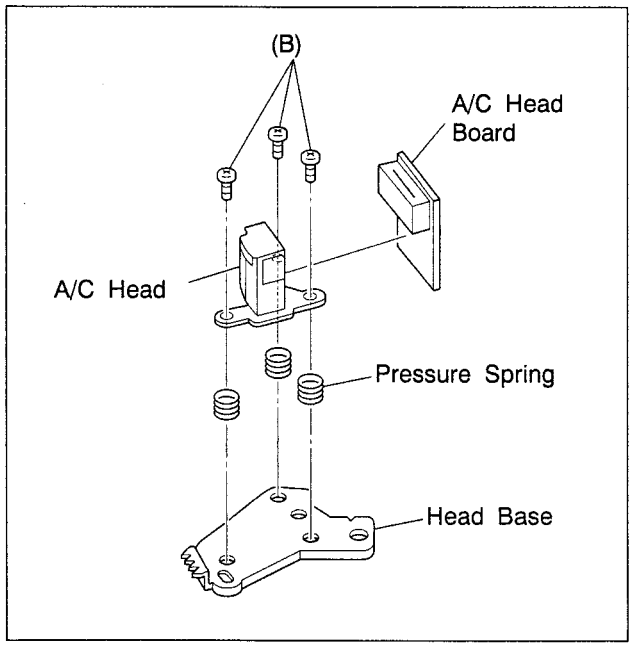


Fig.2-5-3

2. Installation

(1) Temporarily set A/C head height as indicated in Fig. 2-5-4.

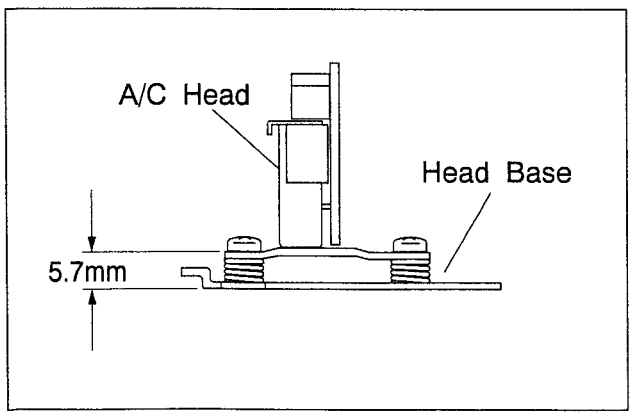


Fig.2-5-4

NOTES:

- *It is very important to correctly adjust the control pulse and audio signal in addition to the mechanical tape path.*
- *Perform interchangeability adjustments after electrical adjustments.*

2.5.3 Pinch Plate

1. Removal

(1) Disengage 2 claws, then remove the pinch plate.

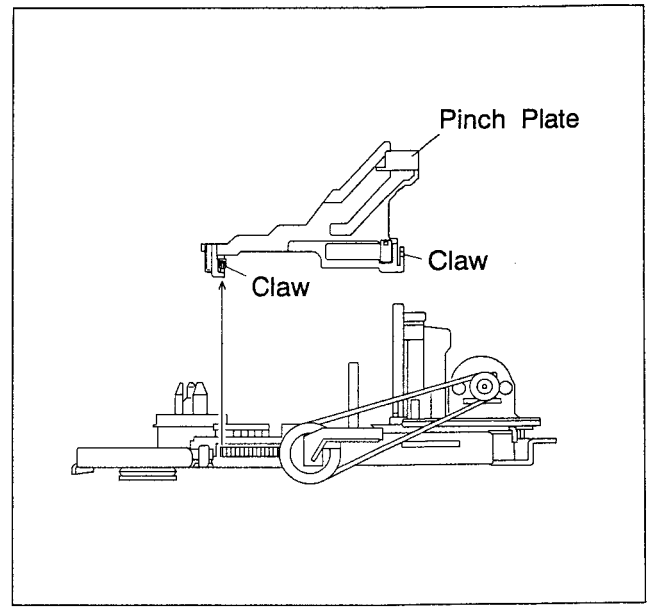


Fig.2-5-5

2. Installation

(1) When installing pinch plate,align rack of pinch plate and triangle mark of control cam as indicated in Fig.2-5-6.

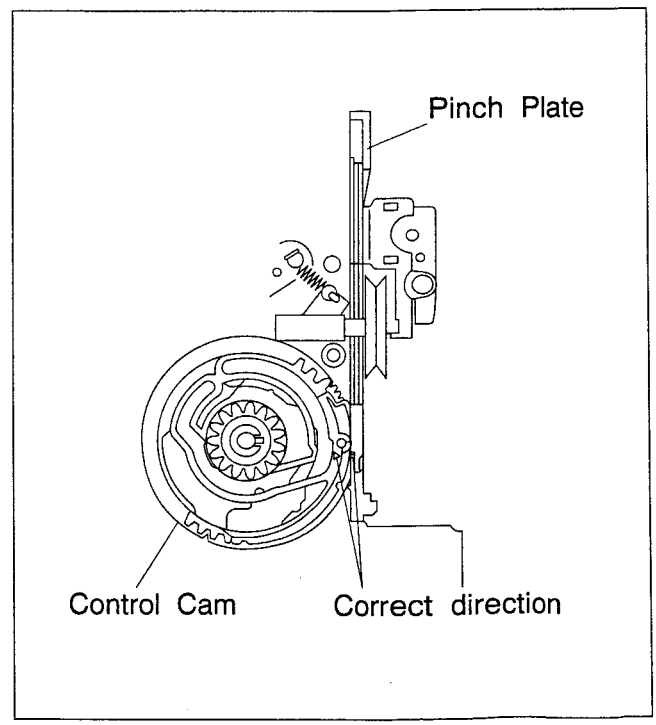


Fig. 2-5-6

2.5.4 Mode Motor

(1) Engage the belt between mode motor and worm gear.
(2) Take out 2 screws (A) then remove the mode motor.

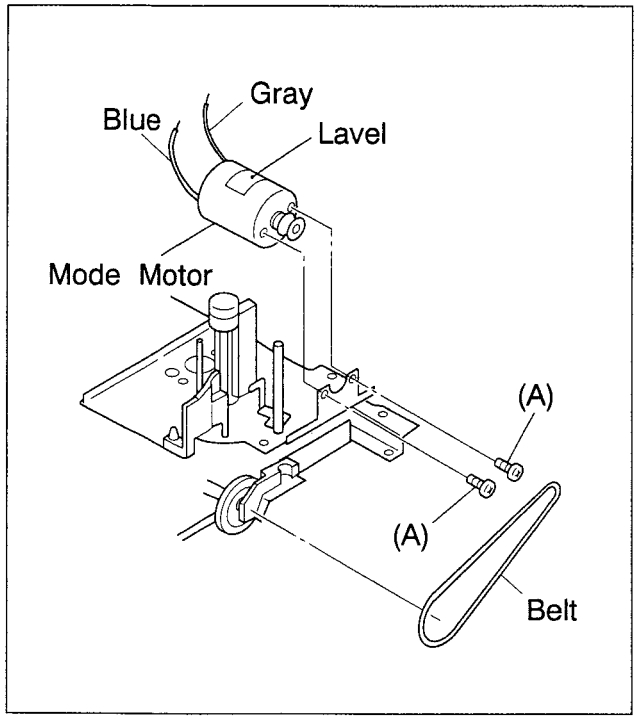


Fig.2-5-7

2.5.5 Lever Assy,Sub Deck Assy,Capstan Motor

(1) Take out 1 slit washer,then remove the lever assy.
(2) Engage the belt(capstan motor) from bottom of mechanism assy first as indicated in Fig.2-5-10.
(3) Take out 3 screws (A) and remove the sub deck assy as indicated in Fig.2-5-8.
(4) Take out 3 screws (B) and remove the capstan motor from the sub deck assy as indicated in Fig.2-5-9.

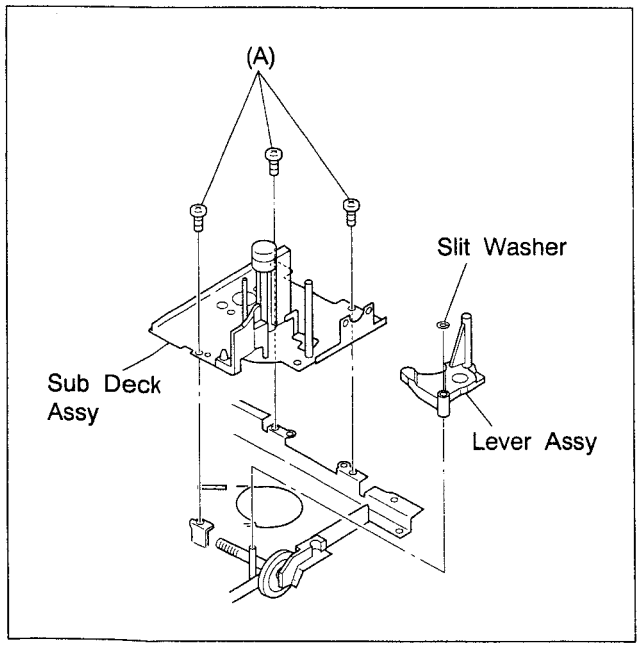


Fig.2-5-8

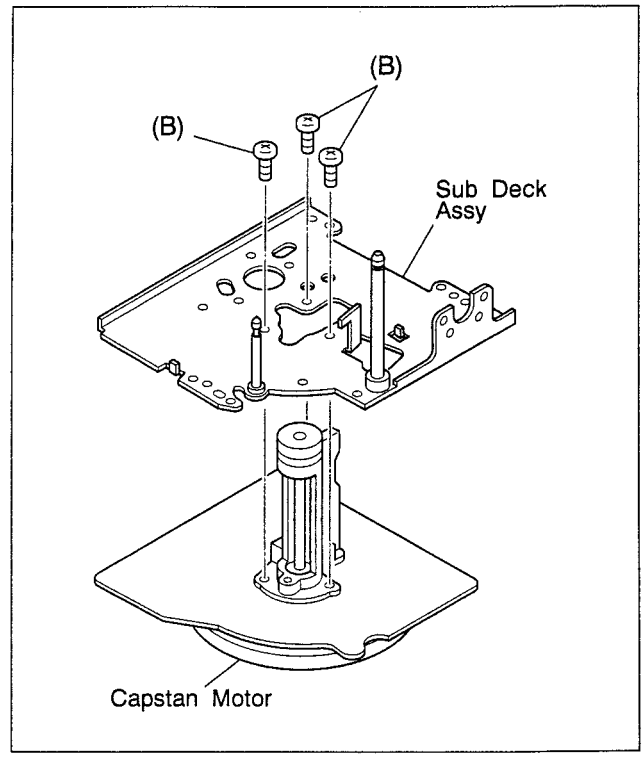


Fig.2-5-9

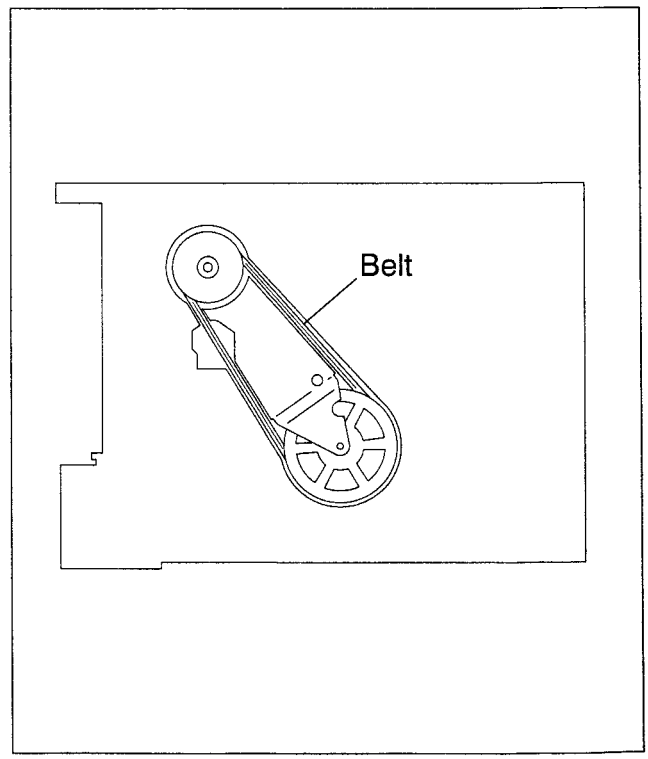


Fig.2-5-10

2.5.6 Control Bracket-1,Earth Pllate

(1) Take out 1 screw (A) and 1 screw (B).
(2) Remove the control bracket-1 and earth pllate.

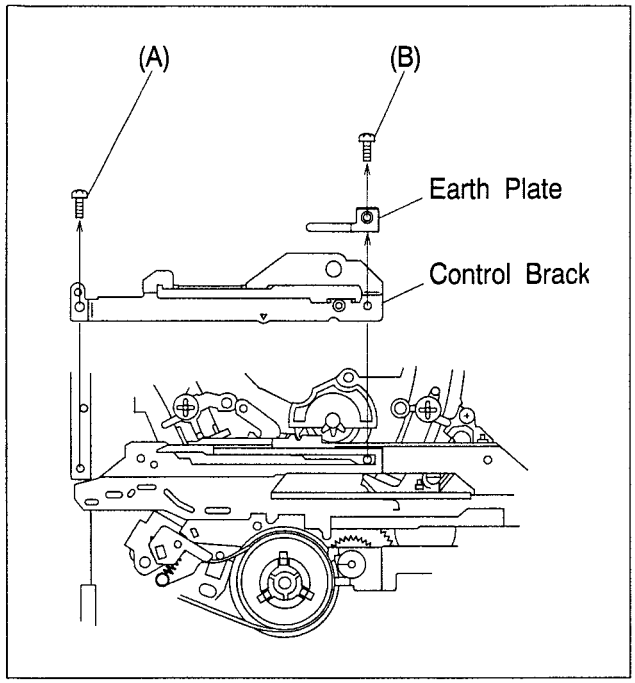


Fig.2-5-11

2.5.7 Reel Bracket,Slit disk (take-up)

(1) Take out 2 slit washers.
(2) Remove the reel bracket and slit disk(take-up).

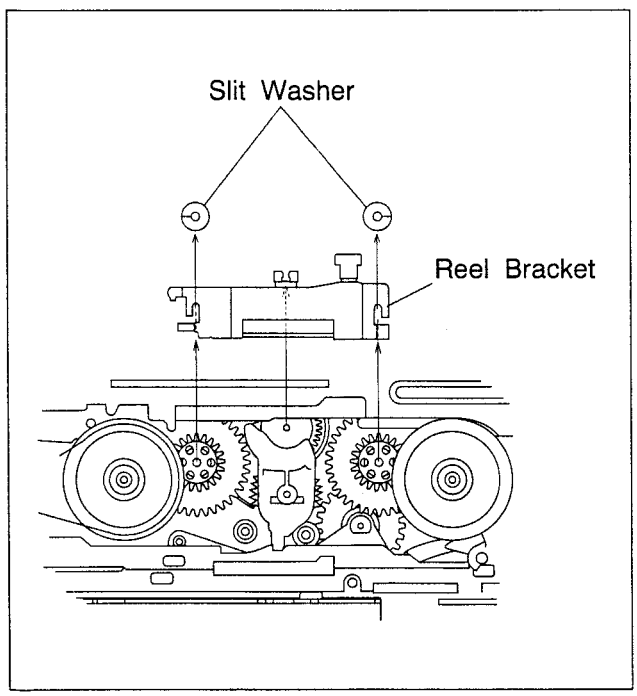


Fig.2-5-12

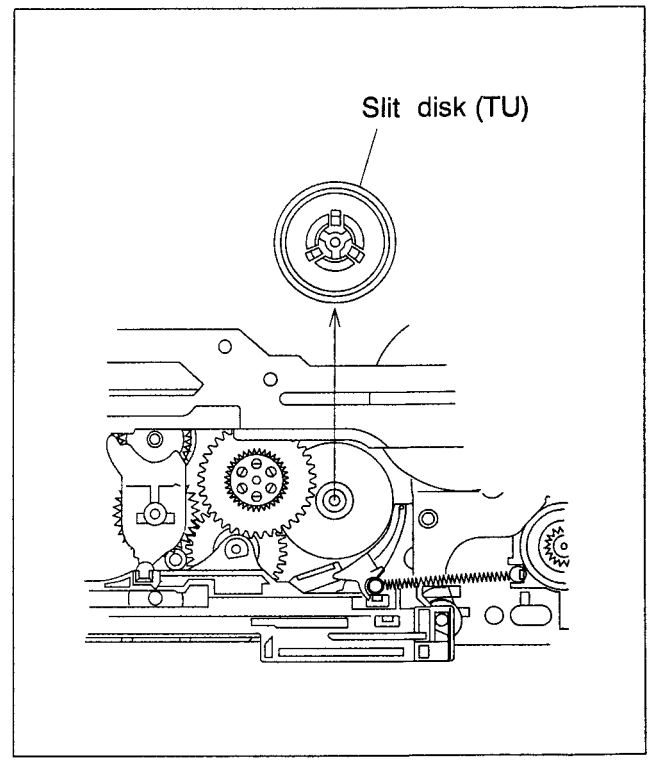


Fig.2-5-13

2.5.8 Control Bracket-2,Control Plate

(1) Take out 1 screw (A) and remove the control bracket-2.
(2) Take out 1 slit washer.
(3) Disengage 2 claws and remove the control plate.

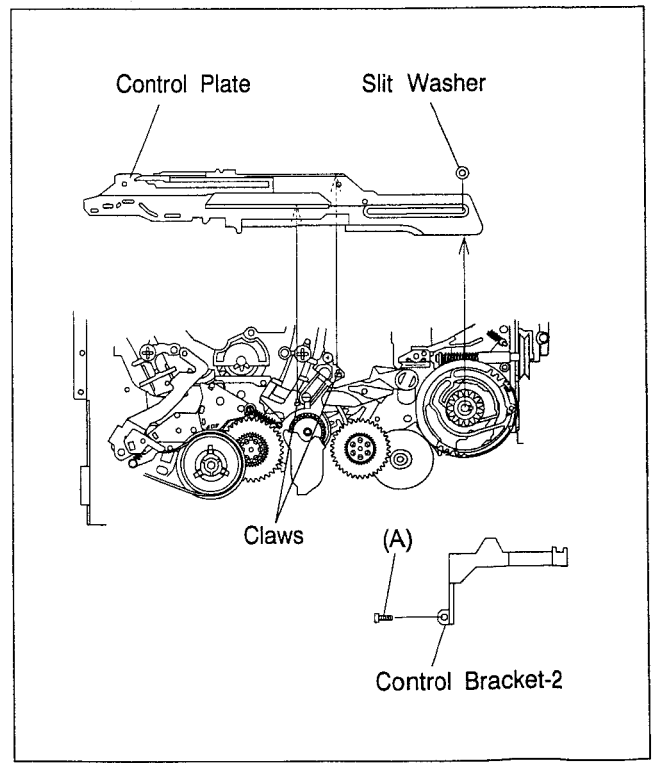


Fig.2-5-14

2.5.9 Sub Brake(take-up),Control Cam

(1) Disengage 1 spring (a) and 1 claw then remove the sub brake (take-up).
(2) Disengage 1 claw and remove the control cam.

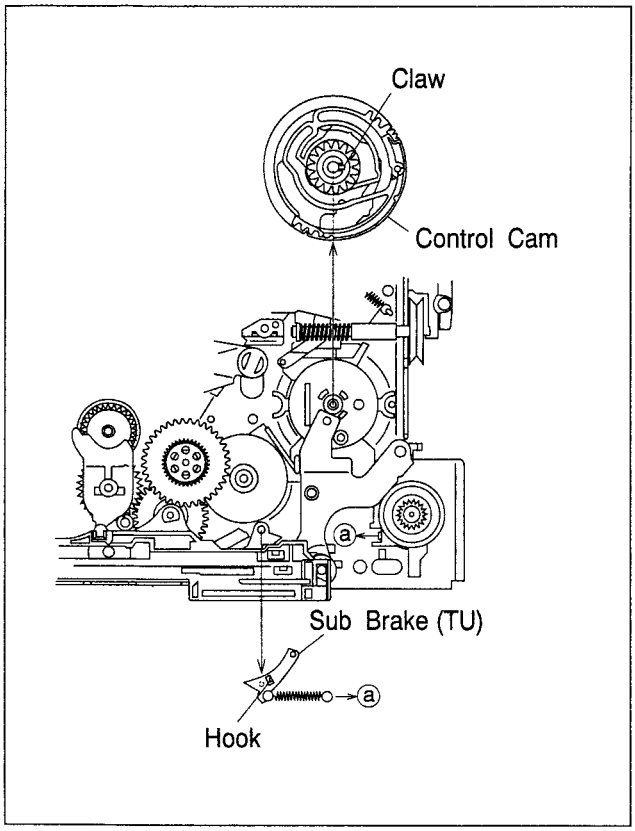


Fig.2-5-15

2.5.10 Slide Plate

(1) Disengage 7 claws from bottom of the mechanism assy and remove the slide plate.

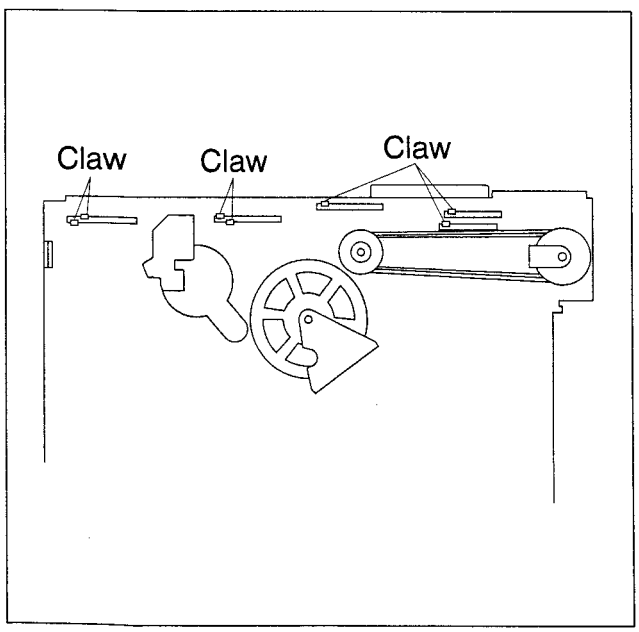


Fig. 2-5-16

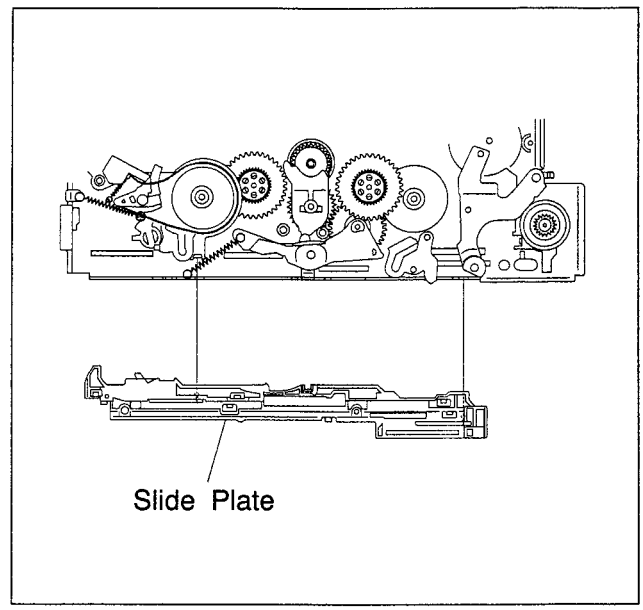


Fig. 2-5-17

2.5.11 Change Lever,Rotary Encoder

(1) Remove the change lever.
(2) Disengage 2 claws and remove the rotary encoder.

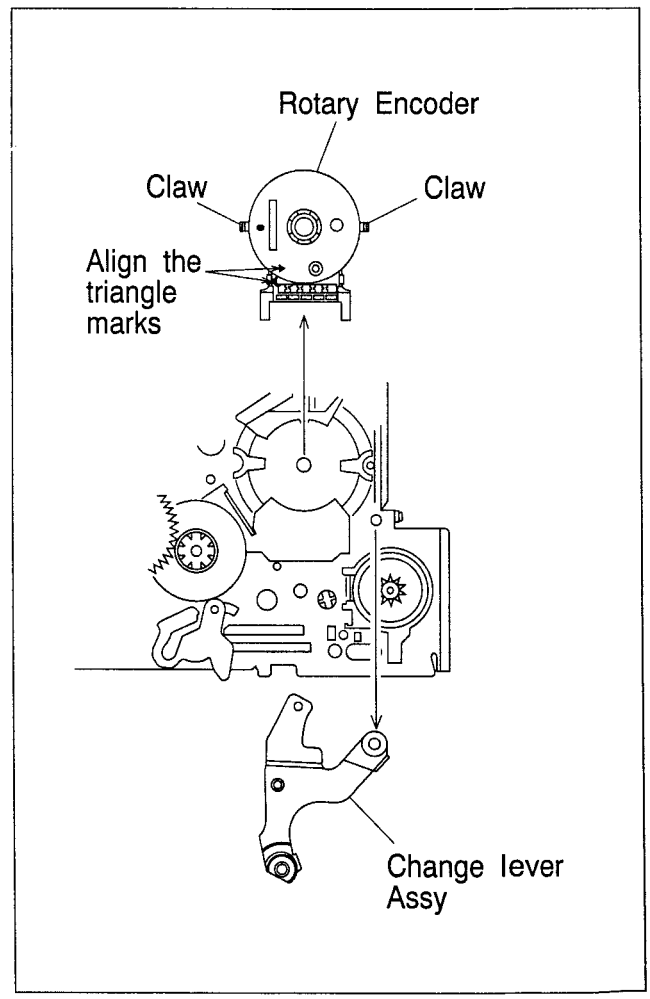


Fig. 2-5-18

2.5.12 Sub Brake (supply),Tension Band Assy,Tension Arm Assy,Take-up Lever Assy,Slit Disk(supply)

(1) Disengage 1 spring (a).
(2) Disengage 1 claw and remove the sub brake (supply).
(3) Take out 1 screw (A),spring (c) and slit washer.
(4) Remove the tension arm assy with tension band assy.
(5) Disengage 1 spring (b) and remove the take-up lever assy.
(6) Remove the slit disk(supply).

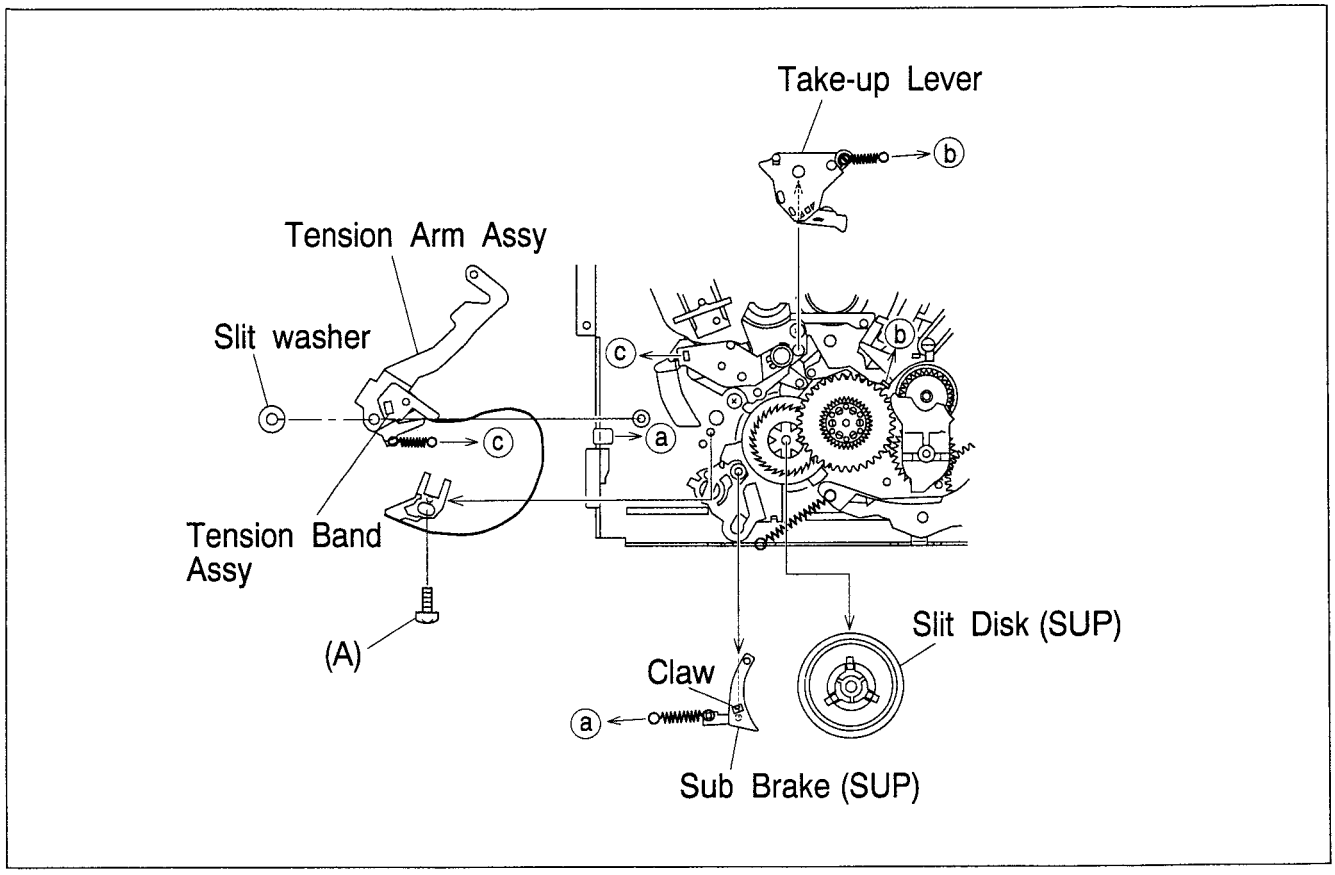


Fig. 2-5-19

2.5.13 Take-up Head,Tension Arm Lever

(1) Remove the take-up head and tension arm lever.

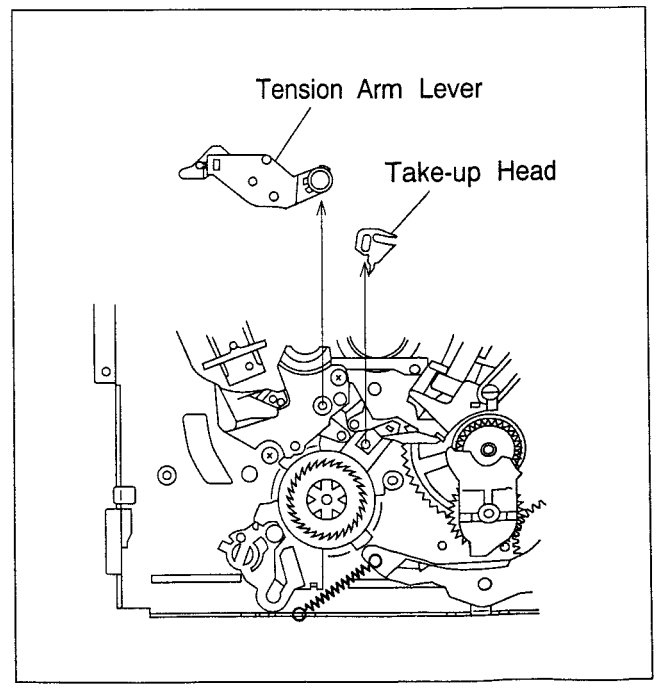


Fig.2-5-20

2.5.14 Guide Rail

(1) Take out 5 screws (A) and 1 screw (B).
(2) Disengage 4 claws and remove the guide rail.

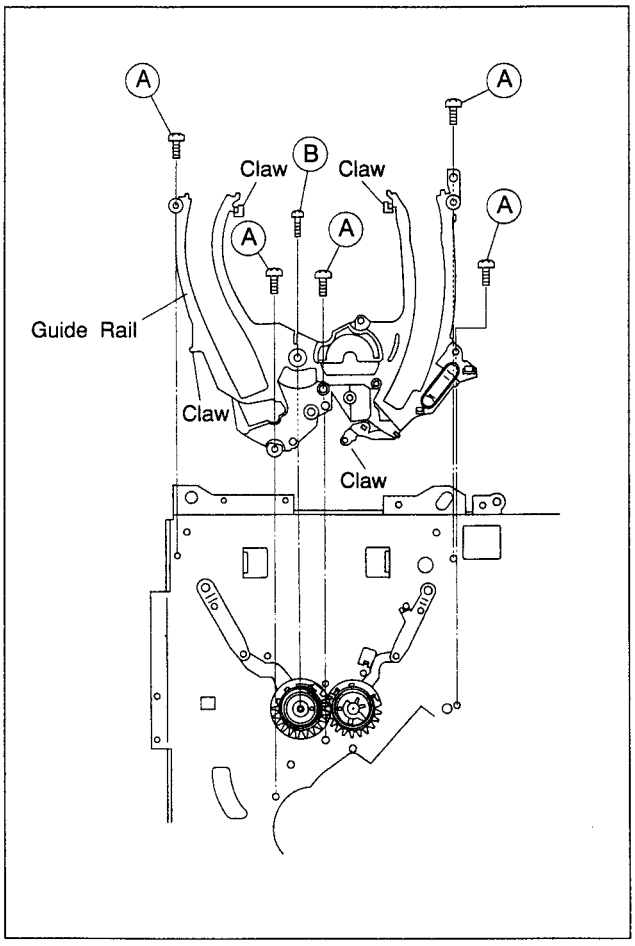


Fig. 2-5-21

2.5.15 Stator Assy

(1) Take out 2 screws (A).
(2) Raise the stator assy in the direction indicated by the arrow to remove it (also remove the inertia roller).
(3) Remove the flat cable.
(4) To reinstall,first secure the flat cable,then insert 2 screws (A).
(5) After reinstalling, be sure to perform PB switching point adjustment(See SECTION 3 ELECTRICAL ADJUSTMENT).

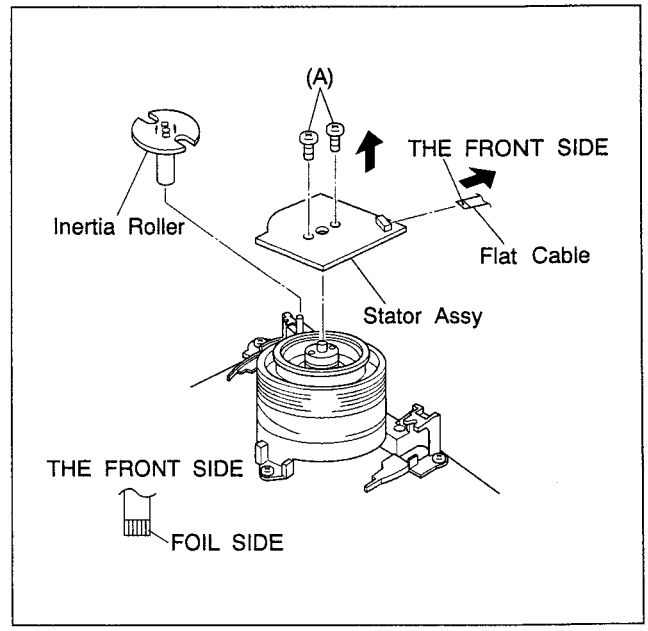


Fig. 2-5-22

NOTE : *When refitting the connector, check that the flat wire is inserted correctly.*

2.5.16 Rotor Assy

(1) Remove the stator assy.
(2) Take out 2 screws (B) and remove the rotor assy.

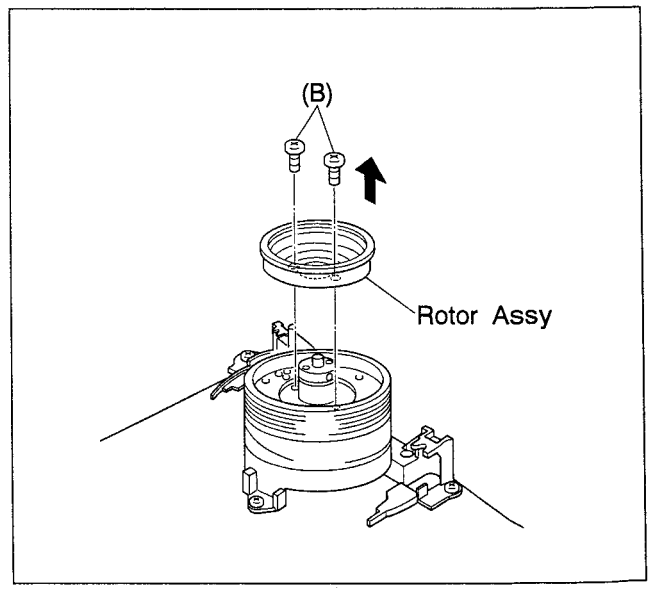


Fig.2-5-23

(3) Align the upper dum assy and rotor assy phase as indicated in Fig.2-5-22.
(4) Overlap holes (a) of the upper drum assy with holes (b) of the rotor assy (align holes in 3 locations) and secure with 2 screws (B) as indicated in Fig.2-5-21.

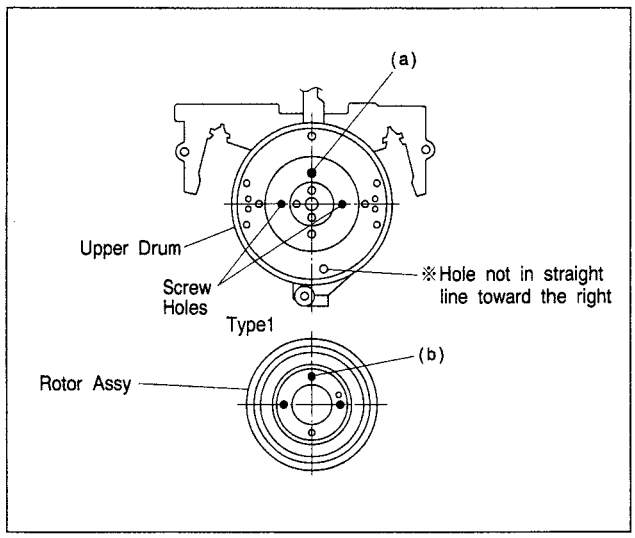


Fig. 2-5-24

2.5.17 Upper Drum Assy

1. Removal

(1) Remove the stator assy and rotor assy.
(2) Use a 1.5 mm hexagonal wrench to loosen the collar assy screw and remove the collar assy.
(3) Remove the upper drum assy and use tweezers to remove the Washer.

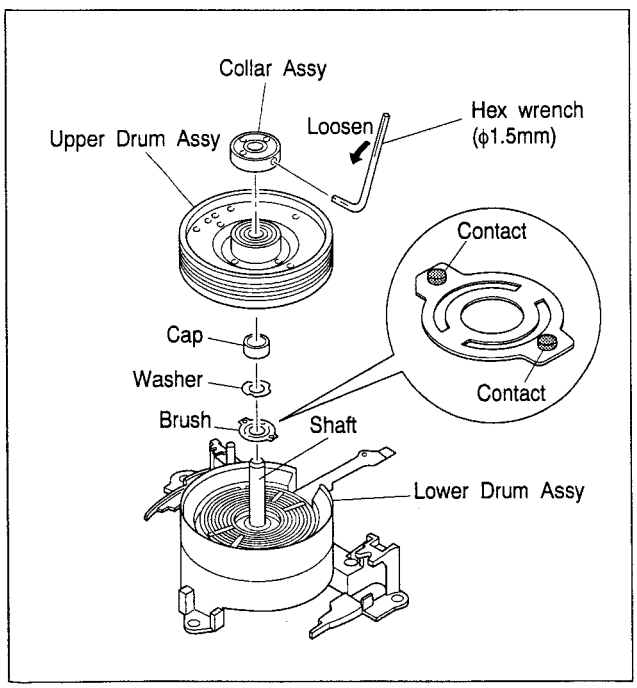


Fig. 2-5-25

NOTE : *If the Brush is replaced, do not apply the grease to the contacts.*

2. Installation

(1) Use an air brush to clean the lower drum assy and the coil section of the new upper drum assy.
(2) Set a new washer on the drum shaft as indicated in Fig.2-5-25.

NOTE : *Be sure to use the new washer when replace the upper drum assy.*

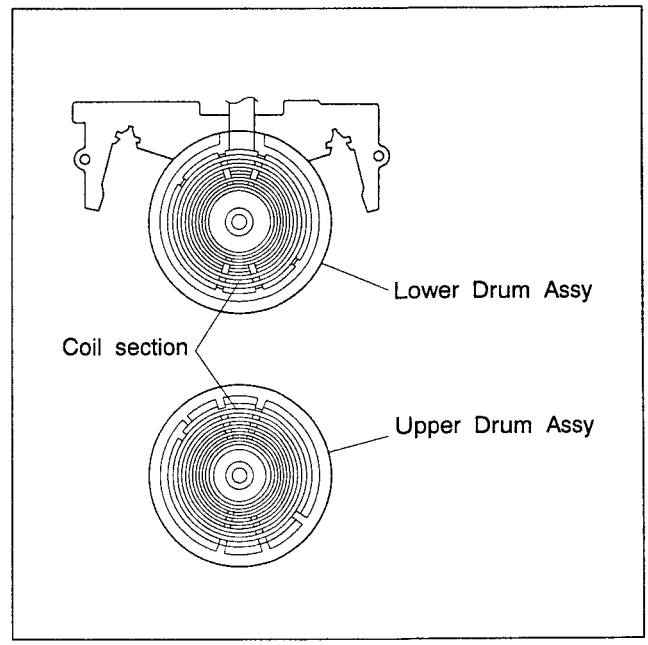


Fig.2-5-26

(3) Note the top and bottom of the collar assy and determine the position as indicated in Fig.2-5-25.

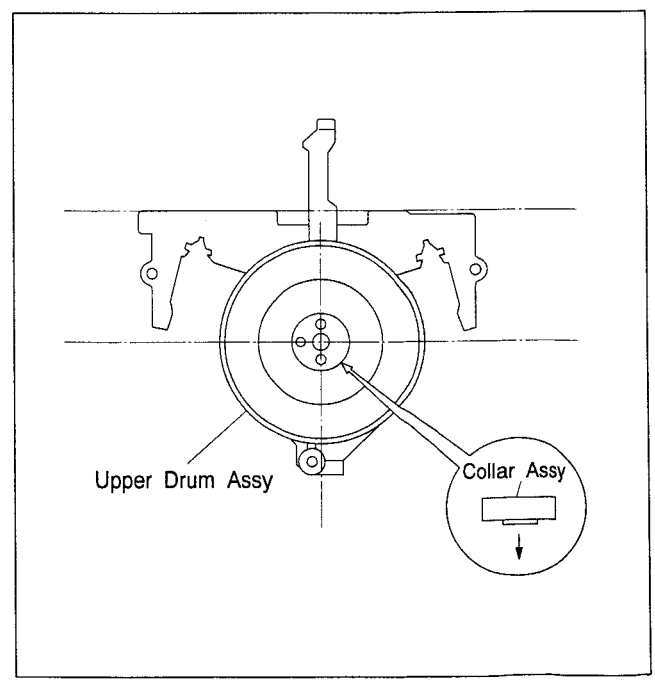


Fig.2-5-27

(4) While pressing the collar assy evently from above with your fingertips,secure the hexagonal screw.

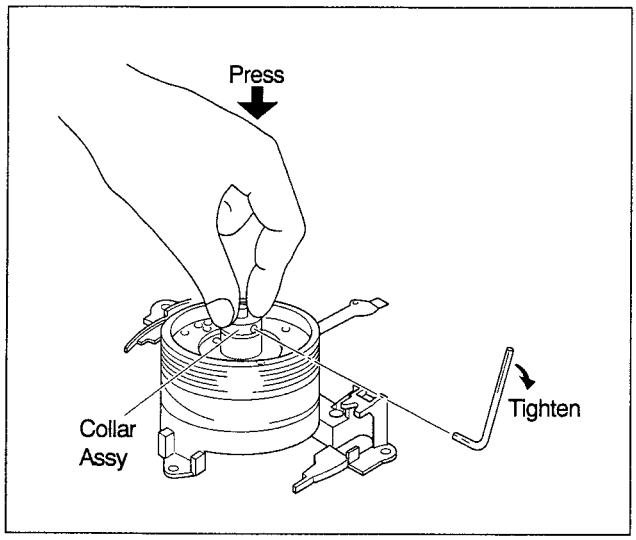


Fig.2-5-28

(5) After installing,gently turn the upper drum by hand and confirm normal rotation.
(6) Install the rotar assy and stator assy.
(7) Clean the upper and lower drum assies and perform the following adjustments;
- PB switching point adjustment
- Slow tracking preset adjustment
- Interchangeability adjustment (be sure to check LP mode)

2.6 CHECKUP AND ADJUSTMENT OF MECHANISM PHASE

2.6.1 Precaution

The rotary encoder and syscon circuit are closely interrelated.Therefore,the rotary encoder and control cam conection determines the operations of mechanical parts such as plates,gears,brakes,etc.Correct positioning of these parts is essential for smooth tape loading and mechanical operations.

2.6.2 Loadidg Arm Assy (supply,take-up)

(1) Install the supply loading arm assy and the take-up loading arm assy so that their positioning markings on the respective gear face each other and the holes of their arms correspond to the holes on the main deck assy respectively.
(2) After setting the guide rails,engage the pole base assies with the tip of the loading arms respectively. Then,enter the mechanism into the unloading mode to return the pole base assies to the front position.
(3) Reassemble the peripheral parts of the guide rail as originally.

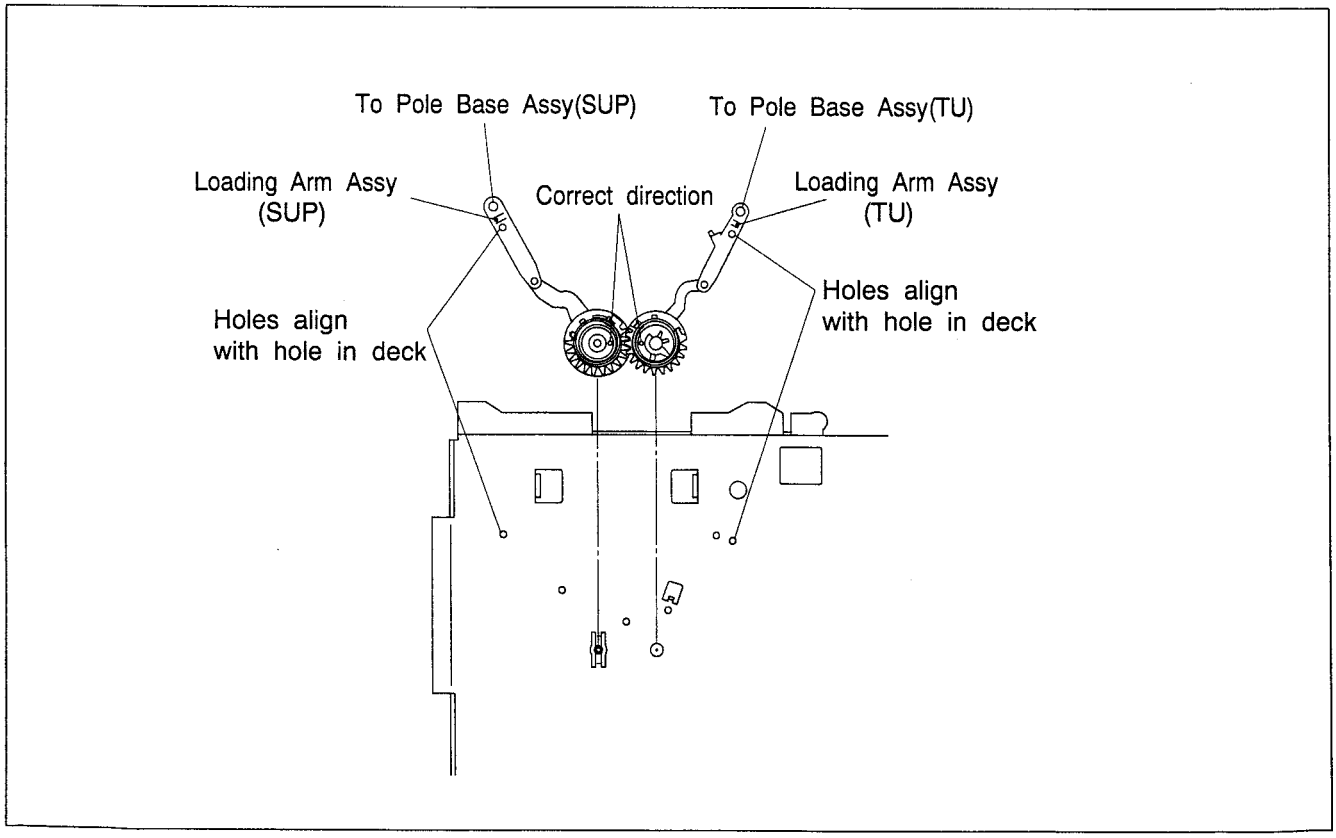


Fig. 2-6-1

2.6.3 Rotary Encoder,Change Lever,Control Cam

(1) When reinstalling the rotary encoder,adjust its position so as to fit the triangle marks each other and push it deep untill it is locked by the pawls.
(2) When reinstalling the change lever,set it so as to make its positioning hole correspond to the hole of the main deck assy.
(3) When re-engaging the control cam,lower the capstan brake assy while setting it so as to make its positioning hole correspond to the hole of the main deck assy.

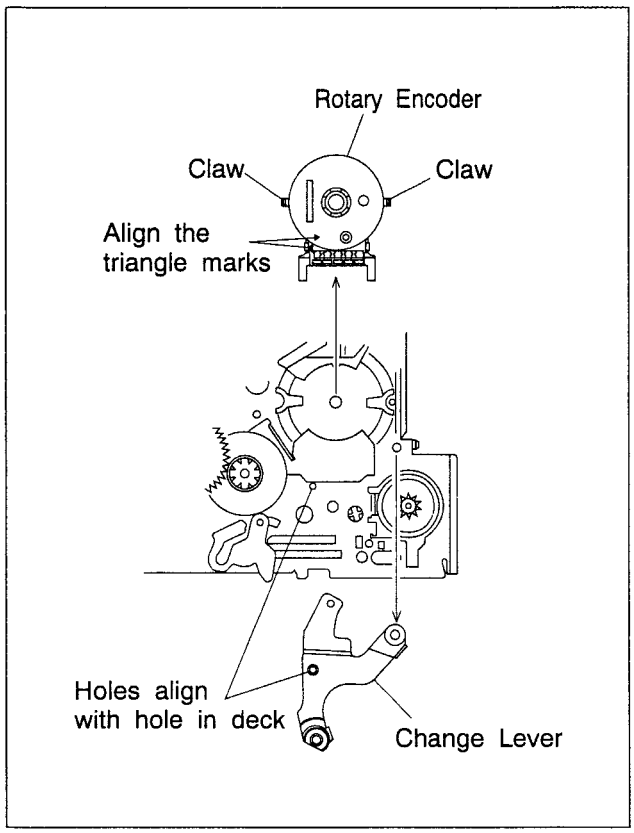


Fig. 2-6-2

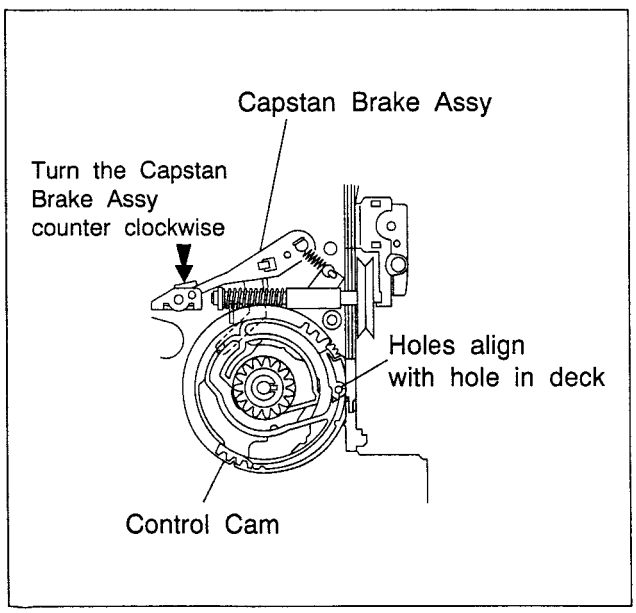


Fig. 2-6-3

2.6.4 Slide Plate

(1) Lower both the main brake assies (supply and take-up) untill they touch the edge of the main deck assy while reinstalling the slide plate so as to make the respective positioning holes of the main brake assies correspond to the holes on the main deck assy.

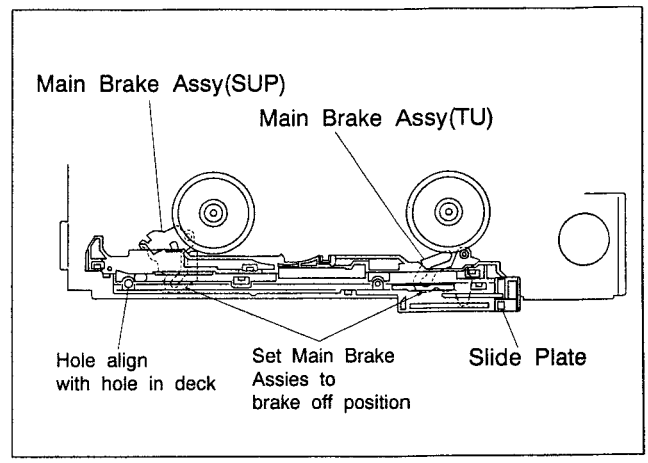


Fig.2-6-4

2.6.5 Control Plate

(1) Reinstall the control plate so as to set the two positioning holes of it on the holes on the main deck assy respectively and to set the positioning hole of the take-up lever on the hole of the main deck at the same time. When adjusting the hole position of the take-up lever,use a pair of tweezers to hold and move it since it is pulled by a tension spring.
(2) After reinstalling the control plate,fix it with the slit washer,control bracket-1 and -2.

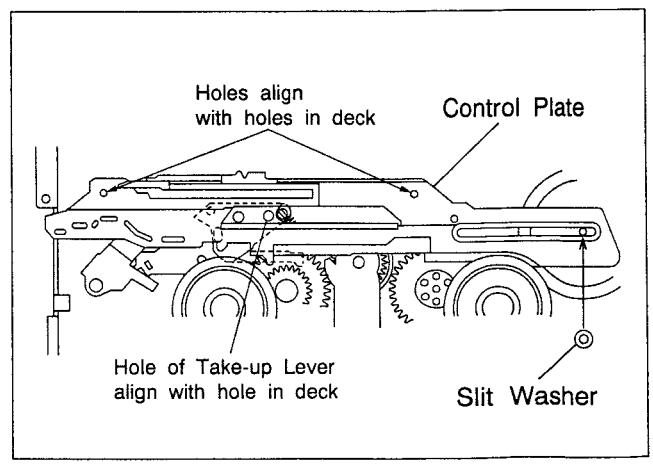


Fig. 2-6-5

2.7 TAPE INTERCHANGEABILITY ADJUSTMENT

NOTE : • *This adjustment is extremely important. However, it is normally not required during routine service. Perform only after replacing major components(A/C head,upper/lower drum assy,pole base assy,etc).*
• *Before using costly alignment tape,use a spare tape and confirm correct operation of the tape transport.*

2.7.1 Tape pattern

(1) Connect the oscilloscope to TP6(PB FM) on the PRE/REC board.Use TP11(D.FF) on the PRE/REC board as a trigger.
(2) Playback the SP stairstep portion of the alignment tape [MHPE].Confirm that the FM waveform appears as indicated in Fig.2-7-1.
(3) Set the manual tracking position by simultaneously pressing the TV PROG. "–" and "+" buttons.
(4) Operate the tracking adjustment (press the TV PROG. buttons during playback) and set for maximum playback FM waveform.
(5) By operating the TV PROG. button,vary the FMwaveform from maximum to minimum and vice versa to confirm that the waveform varies nearly in a flat shape as shown in Fig.2-7-1.
(6) When the FM waveform does not remain flat during this process,first slightly loosen the set screw located at the bottom of the guide rollers.Using the guide roller adjustment tool (Roller driver) ,adjust the supply and take-up guide rollers (refer to Fig.2-7-2) to obtain the correct waveform as indicated in Fig.2-7-3.
(7) By pressing the TV PROG. buttons several times,vary the FM waveform output from maximum to minimum (and vice versa) gradually,and confirm that the variation proceeds in flat shape, as shown in Fig.2-7-3.
(8) Next playback the LP stairstep portion of the alignment tape [MHPE-L] and adjust the tracking control from maximum to minimum the FM waveform,confirm that FM waveform variation is always flat.
(9) Record the signal and play it back in both of the SP and LP mode,confirm that the FM waveform is flat in both mode.
(10) After adjustments,tighten the set screw of the guide rollers.
(11) Confirm that the tape wrinking does not occur at the roller upper or lower limits as indicated in Fig.2-7-4.

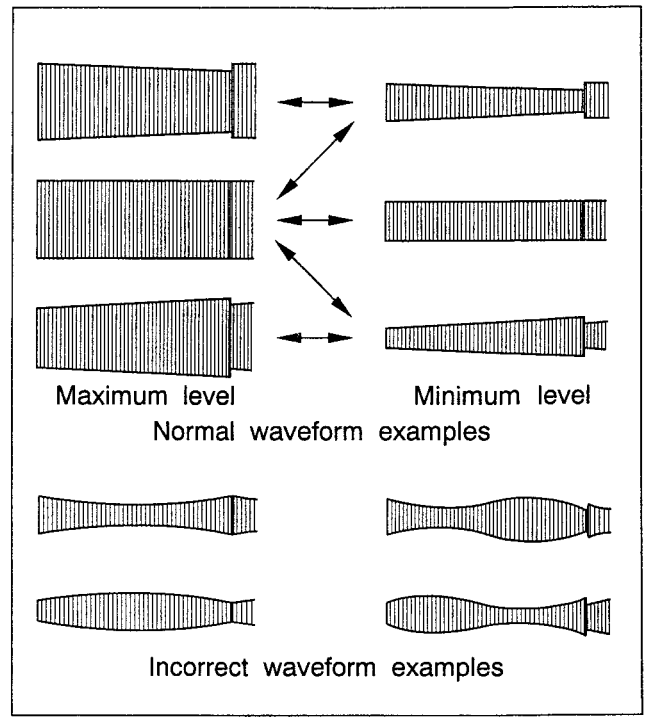


Fig. 2-7-1

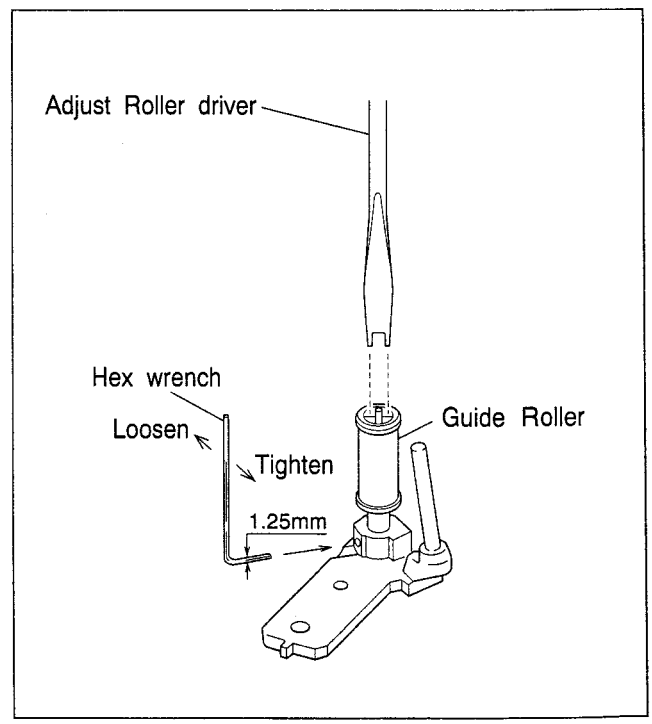


Fig. 2-7-2

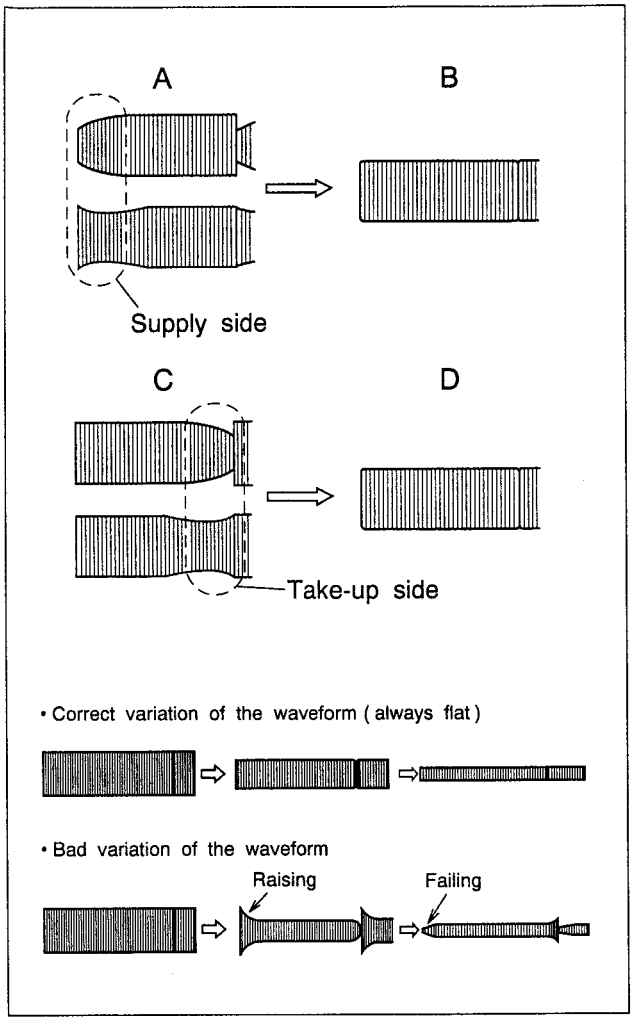


Fig. 2-7-3

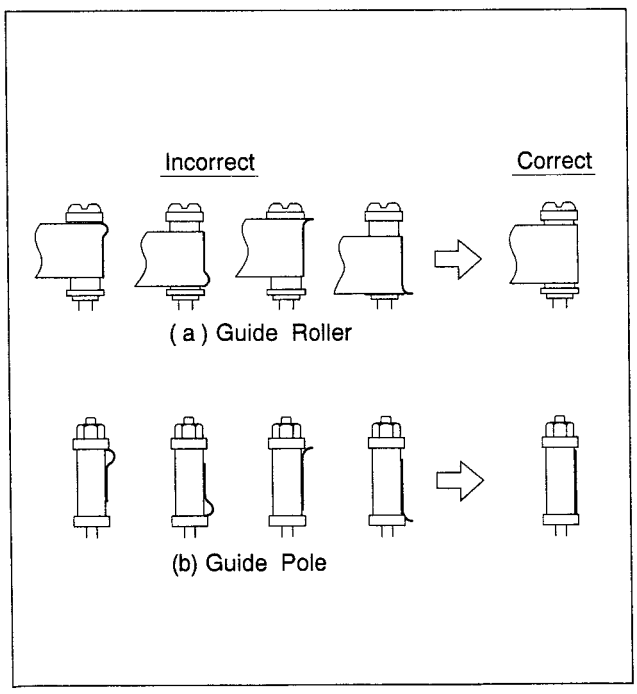


Fig. 2-7-4

2.7.2 A/C head height & azimuth

NOTE : • *Temporarily set A/C head height as indicated in Fig. 2-5-4.*
• *Use spare tape to check the transport and confirm the tape is not scratched or damaged.*

1. Tilt

(1) Use spare tape and set for playback.
(2) Turn screw (3) clockwise to where the tape curls just slightly at the TU guide pole bottom flange as shown in Fig.2-7-5.
(3) Then slowly turn screw (3) counterclockwise to where the curling ceases.

2. Height

(1) Connect CH-1 of a dual trace oscilloscope to Audio Out.
(2) Connect CH-2 to TP401(CTL PULSE) of the Main board assy and use the ALT mode.
(3) Playback the SP stairstep portion of the alignment tape [MHPE].
(4) Adjust screws (1),(2) and (3) for maximum audio output and control pulse level.

3. Azimuth

(1) Connect the oscilloscope to Audio Out.
(2) Playback the SP stairstep portion of the alignment tape [MHPE].
(3) Adjust screw (2) so that the audio output is both maximum and with minimum fluctuation.

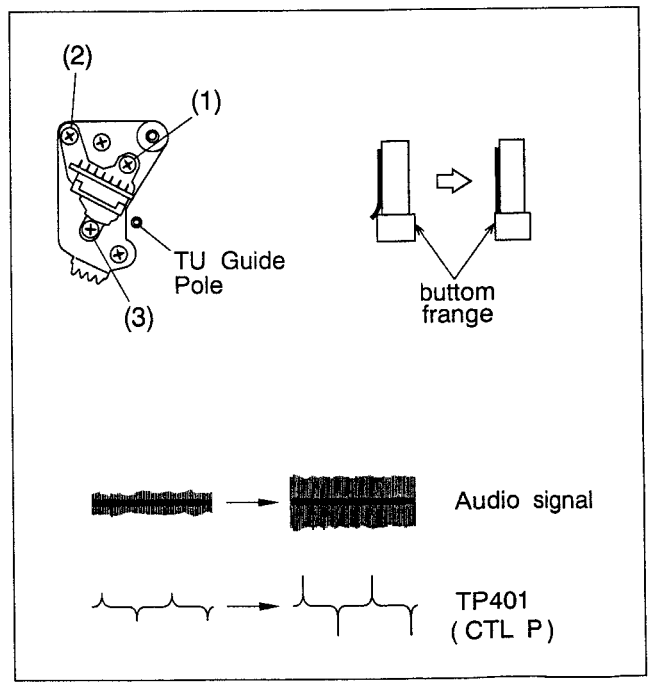


Fig. 2-7-5

2.7.3 A/C head phase(X-value)

(1) Connect the oscilloscope to TP6(PB FM) on the PRE/REC board.Use TP11(D.FF) on the PRE/REC board as a trigger.
(2) Playback the SP stairstep portion of the alignment tape [MHPE].
(3) Set the neutral manual tracking position by simultaneously pressing the TV PROG. "–" and "+" buttons.
(4) If adjustment is required,slightly loosen screws (4) and (5). Set A/C head positioning tool on the A/C head adjusting boss as indicated in Fig.2-7-6.
(5) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig.2-7-7.
(6) Tighten screw (5). Remove the tool and tighten screw (4).

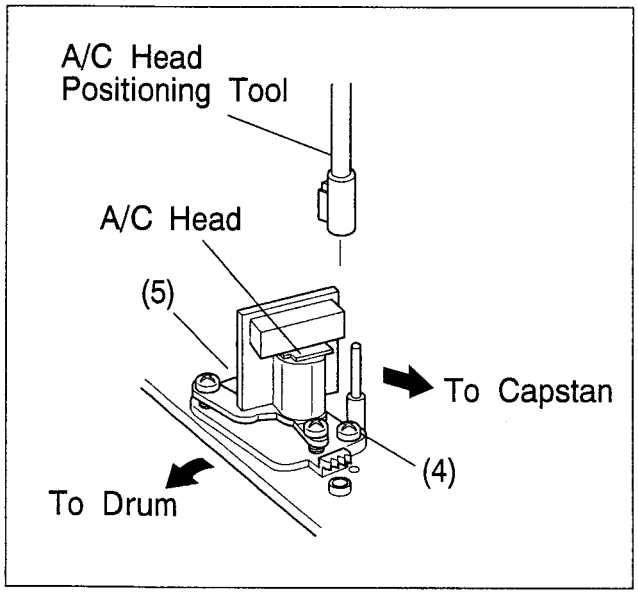


Fig. 2-7-6

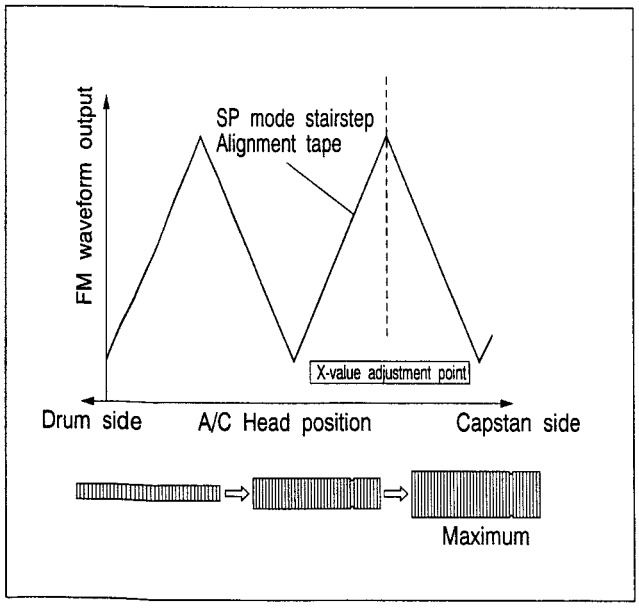


Fig. 2-7-7

2.7.4 Tension pole position

(1) Set for playback mode using MECHANISM SERVICE MODE(See SECTION 1 DISASSEMBLY).
(2) Slightly loosen the screw (A) .
(3) Turn the adjust pin so that the tension arm assy does not touch ϕ2.5 pole on the outside.
(4) Tighten the screw (A).
(5) After adjustment,use the back tension cassette gauge and set for the playback mode.
(6) Confirm reading of 35 to 48 g•cm.

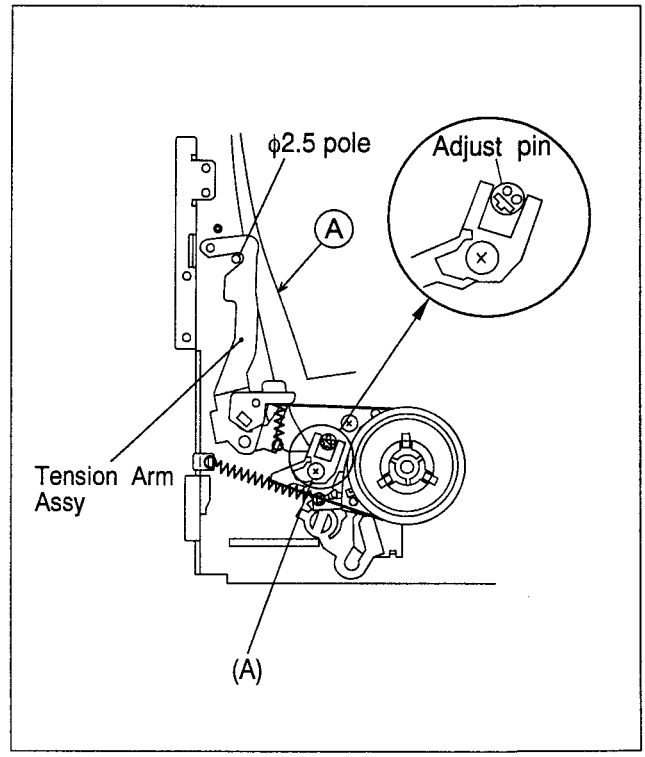


Fig. 2-7-8

2.7.5 Take-up torque

(1) Use the back tension cassette gauge and set for the playback mode.
(2) Confirm reading of 60 to 100 g•cm.

SECTION 3
ELECTRICAL ADJUSTMENT

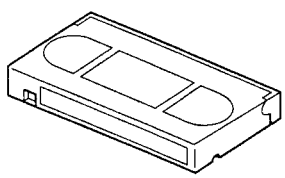
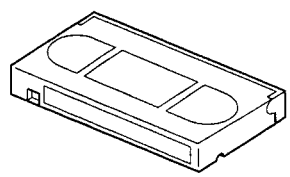
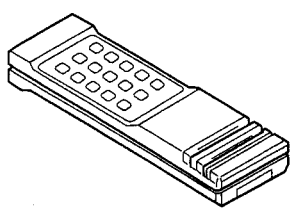
3.1 PRECAUTION

Electrical adjustment are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also do not attempt these adjustments unless the proper equipments is available.

3.1.1 Required test equipment

① Colour television or monitor
② Oscilloscope: wide-band,dual-trace,triggered delayed sweep
③ Frequency counter
④ Digital voltmeter
⑤ Signal generator: RF/IF sweep/maker
⑥ Signal generator: PAL colour bar, stairstep
⑦ Recording tape
⑧ Numeric-key remote controller(provided)

3.1.2 Required adjustment tools

Alignment tape (SP,stairstep) MHPE	Alignment tape (SP,colour bar) MHVE-2
	
Presetting unit PTU94008	
	

3.1.3 Colour bar signal,colour bar pattern

● Colour bar signal

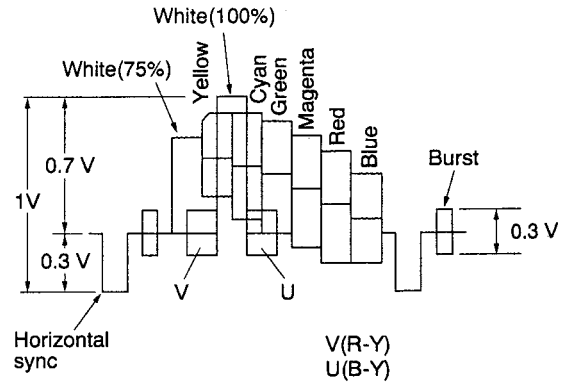


Fig.3-1-1 Colour bar signal waveform

● Colour bar pattern

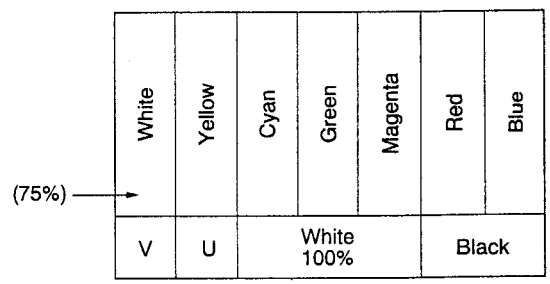


Fig.3-1-2 Colour bar pattern

3.2 SERVO CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
• *Set VCR to the mode A by remote controller.*
• *Use only buttons "E" and "F", depressing other buttons during adjustment may cause adjustment errors.*

1. PB switching point

Signal	• Alignment tape [MHPE],Stairstep
Mode	• PB,Automatic tracking OFF
Equipment	• Oscilloscope
Measurement point	• TP210 (VIDEO OUT)
Trigger slope (-)	• TP11(DRUM FF) , [PRE/REC BOARD]
Adjustment tool	• Presetting unit [PTU94008]
Specification	• 6.5 ± 0.5H

(1) Connect an oscilloscope to TP210 (VIDEO OUT) and external trigger from TP11 (negative slope).
(2) Playback the stairstep signal of the alignment tape.
(3) Set the tracking control to the centre position by simultaneously pressing the TV PROG "+" and "−" buttons or pressing the /// button on the remote controller.
(4) Adjust by pressing "E" or "F" buttons of the presetting unit to position the trigger point 6.5 ± 0.5 H from V.sync.
(5) Depress the STOP button.

Alternate method
(1) Playback the stairstep signal of the alignment tape.
(2) Press the "O" button of the presetting unit.
(3) Confirm that VCR mode becomes STOP mode.

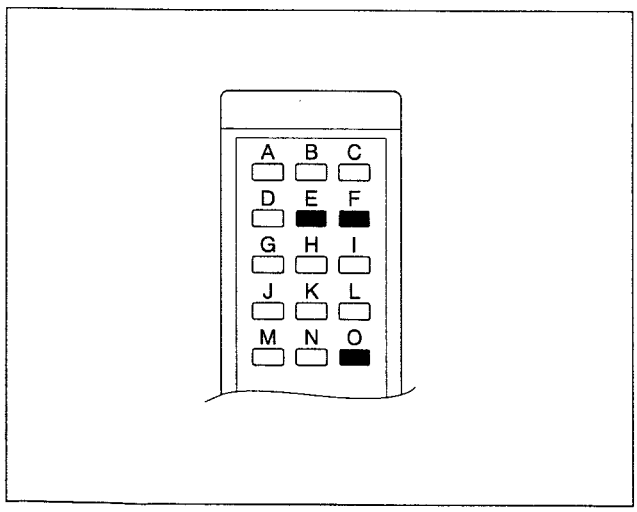


Fig.3-2-1 Presetting unit

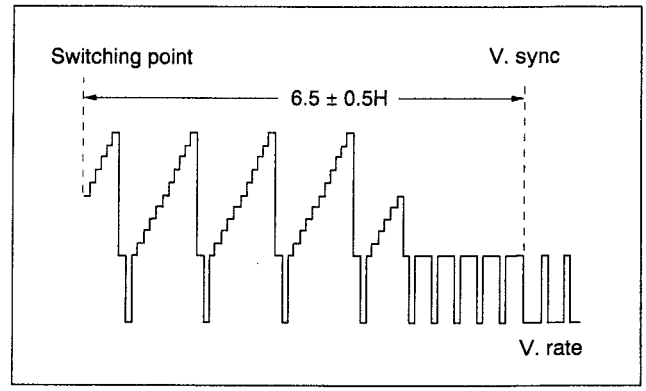


Fig.3-2-2 PB switching point

2. Slow tracking preset

Signal	• Colour bar (PAL,NTSC)
Mode	• SP, REC → PB(SLOW)
Equipment	• TV-Monitor
Adjustment tool	• Presetting unit [PTU94008]
Specification	• Minimum noise

Note : *Set VCR to the mode A by remote controller. Use only buttons "B" and "C", depressing other buttons during adjustment may cause adjustment errors.*

(1) Record a PAL colour bar signal in the SP mode.
(2) Playback recorded signal on the FWD slow mode.
(3) Observe the display on the TV monitor and adjust for optimum noise condition (best tracking) by depressing "B " or "C " buttons of the presetting unit.
(4) Depress the STOP button.
(5) Confirm that the bar noise is not visible on the TV monitor in the slow mode.
(6) Repeat steps (1) to (5) in the NTSC mode.

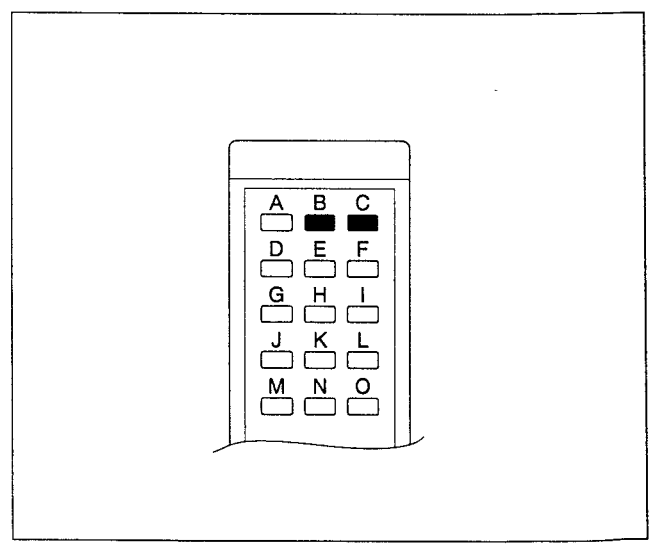


Fig.3-2-3 Presetting unit

3.3 VIDEO CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
• *VIDEO circuit adjustments are performed by the EVR system by use of the presetting unit and numeric-key remote controller.*
• *Set VCR to the mode A by remote controller.*

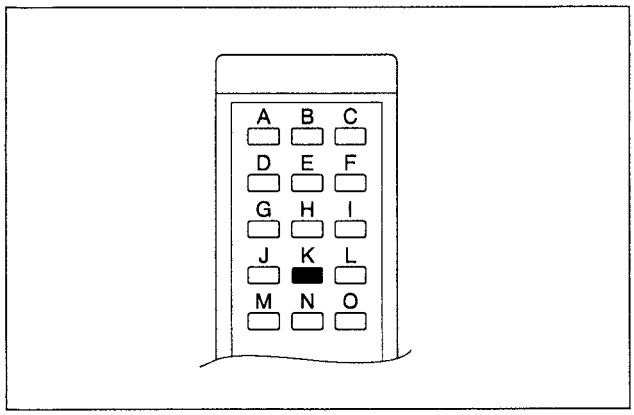


Fig.3-3-1 Presetting unit

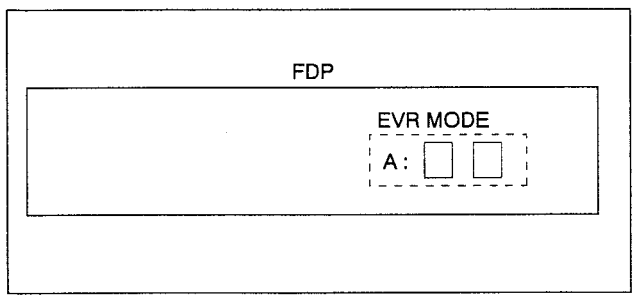


Fig.3-3-2 EVR mode

3.3.1 EE Y LEVEL

Signal	•PAL colour
Mode	•EE
Equipment	•Oscilloscope
Measurement point	•TP210 (VIDEO OUT)
Adjustment tool	•Presetting unit [PTU94008], •Numeric-key remote controller
EVR mode	•A : 11
Specification	•0.98 ± 0.04Vp-p (terminated)

(1) Connect an oscilloscope to TP210(VIDEO OUT).
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 11" pressing 1 numeric key twice of the remote controller.
(4) Adjust TV PROG "–" or "+" button for 0.98 ± 0.04Vp-p.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

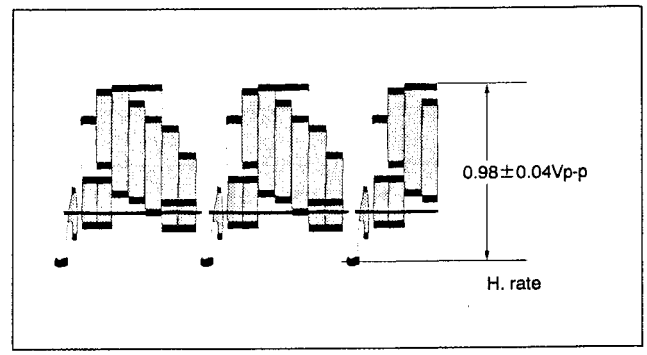


Fig. 3-3-3 EE Y level

3.3.2 WHITE/DARK CLIP

Signal	• PAL colour
Mode	• EE
Equipment	• Oscilloscope
Measurement point	• IC201 pin 13
Adjustment tool	• Presetting unit [PTU94008], • Numeric-key remote controller
EVR mode	• A : 14
Specification	• WHITE CLIP : 90 ± 4% DARK CLIP : 45 ± 8%

(1) Connect an oscilloscope to IC201 pin 13.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 14" pressing 1 and 4 numeric keys of the remote controller.
(4) Adjust TV PROG "–" or "+" button for 90 ± 4% white clip and 45 ± 8% dark clip as shown in Fig.3-3-4.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

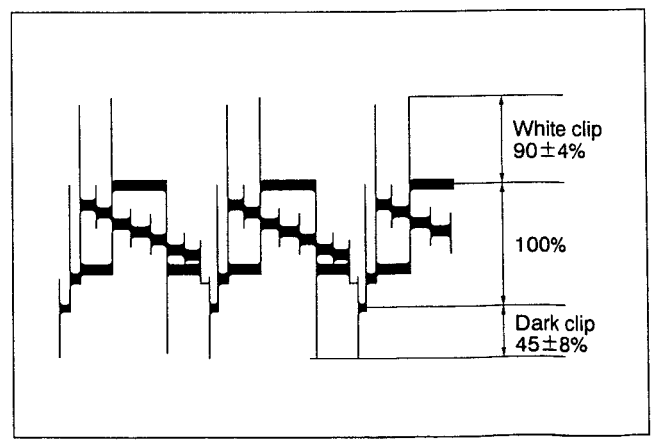


Fig.3-3-4 Whate/dark clip

3.3.3 REC COLOUR LEVEL

Signal	• PAL colour
Mode	• REC
Equipment	• Oscilloscope
Measurement point	• IC201 pin 33
Adjustment tool	• Presetting unit [PTU94008], •Numeric-key remote controller
EVR mode	• A : 2
Specification	• 250 ± 15mVp-p

(1) Connect an oscilloscope to IC201 pin 33.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 2" pressing 2 numeric key of the remote controller.
(4) Adjiust TV PROG "–" or "+" button for 250 ± 15mVp-p.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

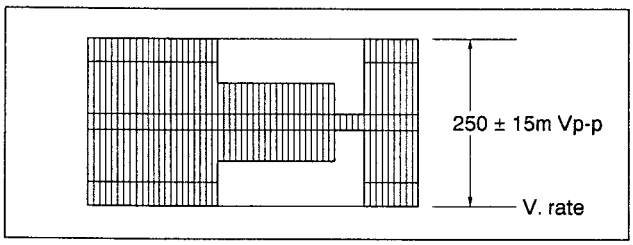


Fig.3-3-5 REC colour level

3.3.4 PB Y LEVEL

Signal	• Alignment tape [MHVE-2] colour bar
Mode	• PB
Equipment	• Oscilloscope
Measurement point	•TP210 (VIDEO OUT)
Adjustment tool	• Presetting unit [PTU94008], •Numeric-key remote controller
EVR mode	• A : 11
Specification	• 0.98 ± 0.04Vp-p (terminated)

(1) Connect an oscilloscope to TP210 (VIDEO OUT).
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 11" pressing 1 numeric key twice of the remote controller.
(4) Playback the colour bar signal of the alignment tape.
(5) Adjust TV PROG "–" or "+" button for 0.98 ± 0.04Vp-p as shown in Fig.3-3-6.
(6) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

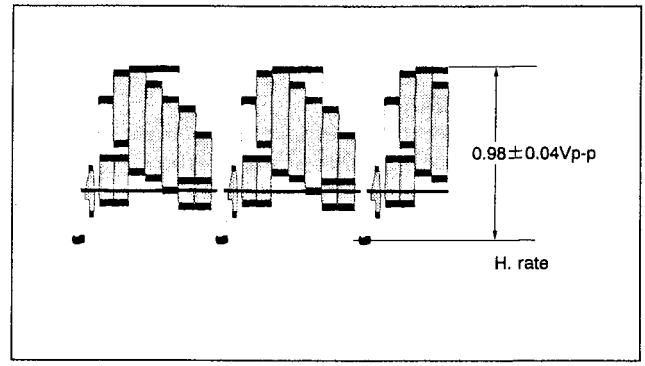


Fig.3-3-6 PB Y level

3.3.5 CARRIER

Signal	• No signal
Mode	• EE
Equipment	• Frequency counter
Measurement point	• IC201 pin 19
Adjustment tool	• Presetting unit [PTU94008], •Numeric-key remote controller
EVR mode	• A : 12
Specification	• 3.80MHz ± 0.04MHz

(1) Connect an oscilloscope to IC201 pin 19.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 12" pressing 1 and 2 numeric keys of the remote controller.
(4) Adjust TV PROG "–" or "+" button for 3.80MHz ± 0.04MHz.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.3.6 DEVIATION

Signal	• PAL colour
Mode	• REC then PB
Equipment	• Oscilloscope
Measurement point	• TP210 (VIDEO OUT)
Adjustment tool	• Presetting unit [PTU94008], • Numeric-key remote controller
EVR mode	• A : 13
Specification	• 0.98 ± 0.04Vp-p (terminated)

(1) Connect an oscilloscope to TP210(VIDEO OUT).
(2) Set EVR mode by pressing "K" button of the presetting unit more than 2 seconds.
(3) Set "A : 13" pressing 1 and 3 numeric keys of the remote controller.
(4) Record and playback a colour bar signal.
(5) Before recording, Adjust TV PROG "-" or "+" button so that Y level becomes 0.98 ± 0.04Vp-p during playback as shown in Fig.3-3-7.
(6) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

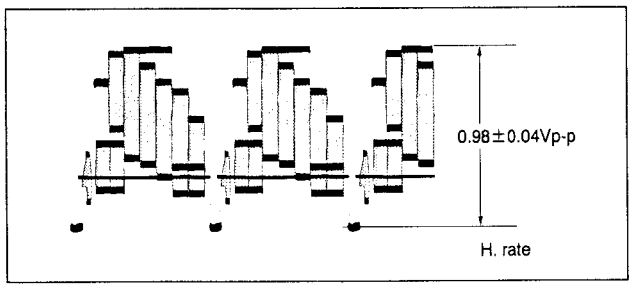


Fig.3-3-7 Deviation

3.4 SYSCON CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
• *When performing this adjustment,remove the MECHANISM assy.*

3.4.1 Timer clock

Signal	• No signal
Mode	• EE
Equipment	• Frequency counter
Measurement point	• IC601 pin 64
Adjustment part	• C601 (TIMER CLOCK)
Specification	• 1024.008 ± 0.001 Hz [976.5549 ± 0.0010 usec]

(1) Connect the frequency counter to IC601 pin 64 and GND.
(2) Connect the short wire between IC601 pin 33 and IC601 pin 63.
(3) Short the leads of capacitor C604 once in order to reset IC601.
(4) Disconnect the short wire then connect it again quickly.
(5) Adjust C601 for 1024.008 ± 0.001 Hz.
(976.5549 ± 0.0010 usec)

3.5 TUNER CIRCUIT

Note: *Unless otherwise specified, all measurement points and adjustment parts are located on the IF UNIT.*

3.5.1 RF AGC

Signal	• TV broadcasting
Mode	• Tuner
Equipment	• TV monitor
Measurement point	• IF UNIT
Adjustment part	• IF VR
Specification	• Minimum noise

Note: *Adjust IF VR (RF AGC) to correct for excess noise in the picture or when streaks cross interference occurs due to strong electrical fields.*

(1) Adjust IF VR to minimize noise or streaks on the TV screen.
(2) Adjust for noisy picture with strong signal. Then adjust until noise just disappears. Select other channels to confirm proper pick-up of channels.

SECTION 4
CHARTS AND DIAGRAMS

SCHEMATIC DIAGRAM NOTES

Safety precautions

The Components identified by the symbol ⚠ are critical for safety. For continued safety, replace safety critical components only with manufactures recommended parts.

1. Schematic diagram values

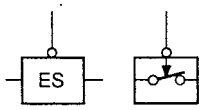
Unless otherwise specified.

1) All resistance values are in ohms. 1/6 W, 1/8 W (refer to parts list).
   Chip resistors are 1/16 W.
   K: KΩ (1000Ω), M: MΩ (1000KΩ)
2) All capacitance values are in μF, (P: PF).
3) All inductance values in μH, (m: mH).
4) All diodes are 1SS133 or MA165, (refer to parts list).

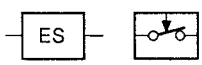
2. Indications

AUX : Active only at high.

$\overline{AUX}$: Active only at low.



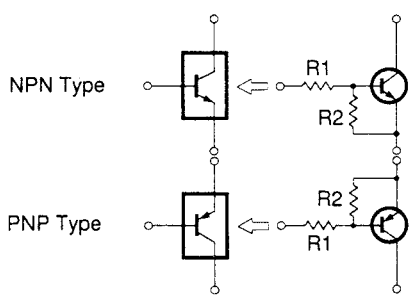
Active only at low for electronic switch.



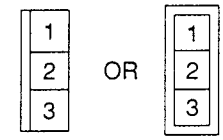
Active only at high for electronic switch.

Digital transistor :

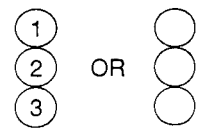
The digital transistor includes built in resistors.
It features small size and high reliability.



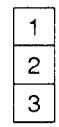
3. Interpreting Connector indications



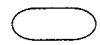
Removable connector



Direct connection on board



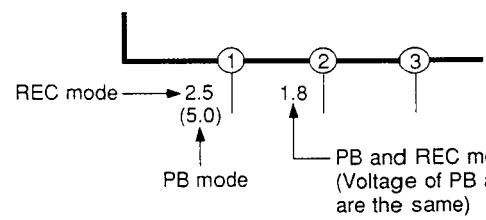
Non-removable Board connector



Connected pattern on board

4. Voltage measurement

1) Video circuits
   REC: Colour bar signal in SP mode, normal VHS mode.
   PB : Alignment tape, colour bar SP mode, normal VHS mode.
   — : Unmeasurable or unnecessary to measure.
2) Audio circuits
   REC: 1KHz, –8 dBs sine wave signal in SP mode, Normal VHS mode.
   PB : REC then playback it.
3) Movie Camera circuits
   Measured using a correctly illuminated grey scale or colour bar test charts in the E-E mode.
4) Indication on schematic diagram
   Voltage Indications for REC and PB modes on the schematic diagram are as shown below.



Note: If do not indicate for voltage measurement on the schematic diagram, refer to the voltage charts.

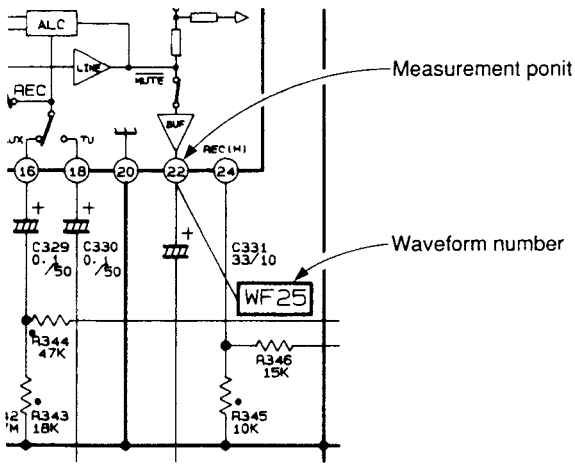
5. Waveform measurement

1) Video circuits
REC: Colour bar signal in SP mode, normal VHS mode.
PB : Alignment tape, colour bar SP mode, normal VHS mode.

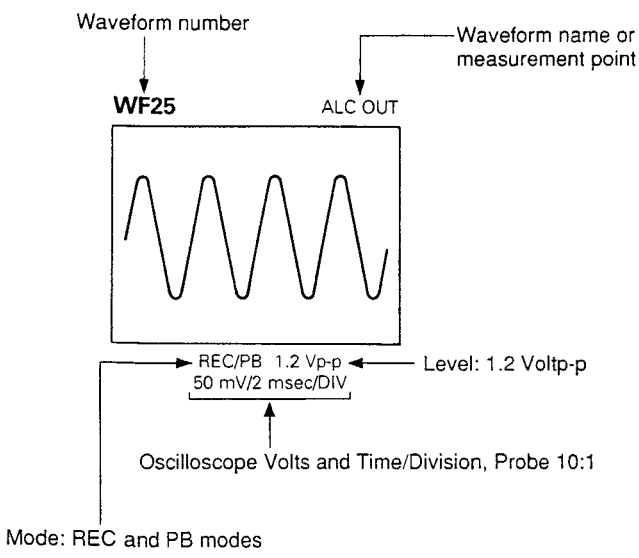
2) Audio circuits
REC: 1KHz, –8 dBs sine wave signal in SP mode, normal VHS mode.
PB : REC then playback it.

3) Movie Camera circuits
Measured using a correctly illuminated grey scale or colour bar test charts in the E-E mode.

4) Indication on schematic diagram
Waveform indications on the schematic diagram are as shown below.



5) Waveform indications



6. Signal path Symbols

The arrows indicate the signal path as follows.

- Playback signal path
- Playback and recording signal path
- Recording signal path (including E-E signal path)
- Y signal path
- Colour (Chroma) signal path
- R or R-Y signal path
- B or B-Y signal path
- Capstan servo path
- Drum servo path
- Reel servo path

CIRCUIT BOARD NOTES

1. Colour indications

1) Foil side :
Foil side patterns are indicated at GREY shading.
2) Component side :
Component side patterns are indicated at RED shading.

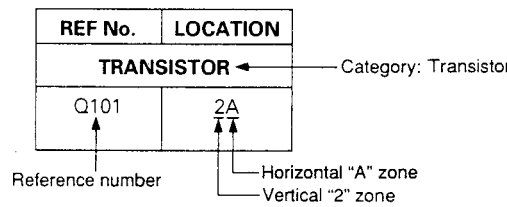
2. Foil and Component sides

1) Foil side (B side) :
Parts on the foil side seen from foil face (pattern face) are indicated.
2) Component side (A side) :
Parts on the component side seen from component face (parts face) are indicated.

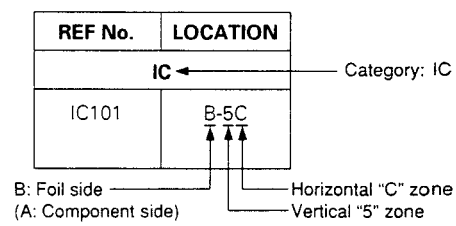
3. Parts location guides

Parts location are indicated by guide scale on the circuit board.

1) Signal pattern :



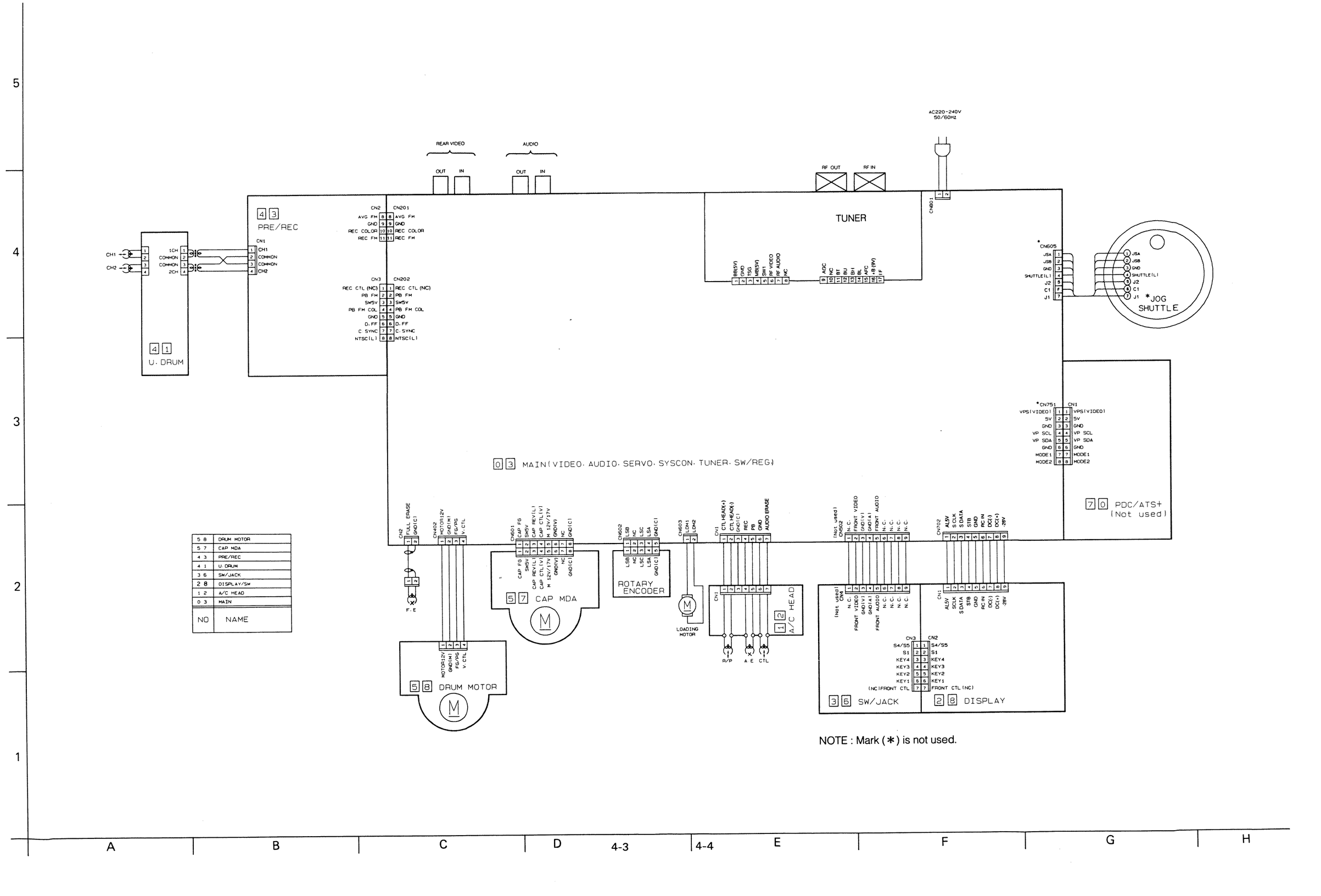
2) Double pattern :



Notes:

1) **For general information in service manual, please refer to the Service Manual of GENERAL INFORMATION Edition 4 No. 82054D (January 1994).**
2) **For repairing SMC (Surface Mounted Components), please refer to the VIDEO SERVICE GUIDE No. VTS81001.**

4.1 BOARD INTERCONNECTIONS

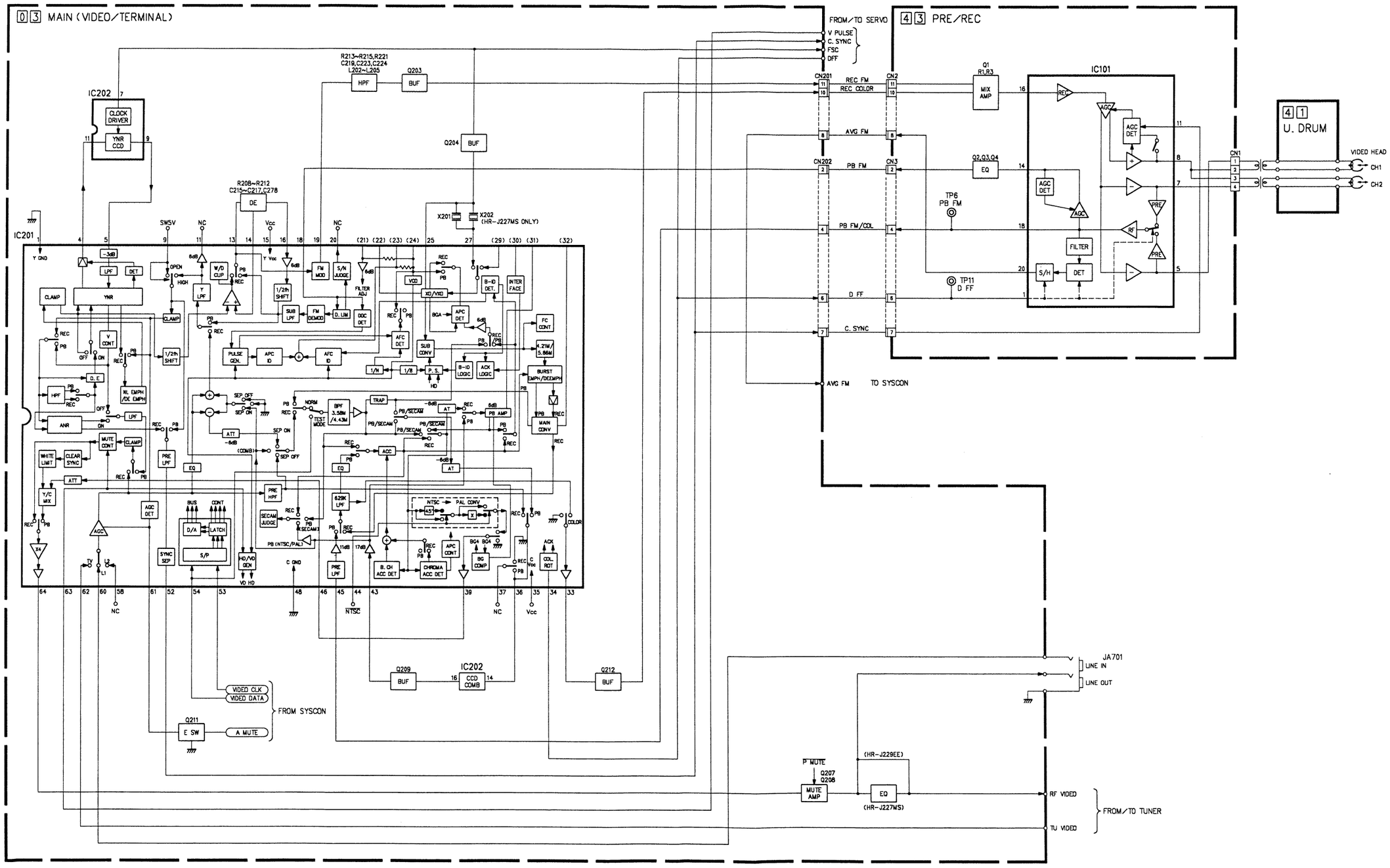


5 8	DRUM MOTOR
5 7	CAP MDA
4 3	PRE/REC
4 1	U. DRUM
3 6	SW/JACK
2 8	DISPLAY/SW
1 2	A/C HEAD
0 3	MAIN

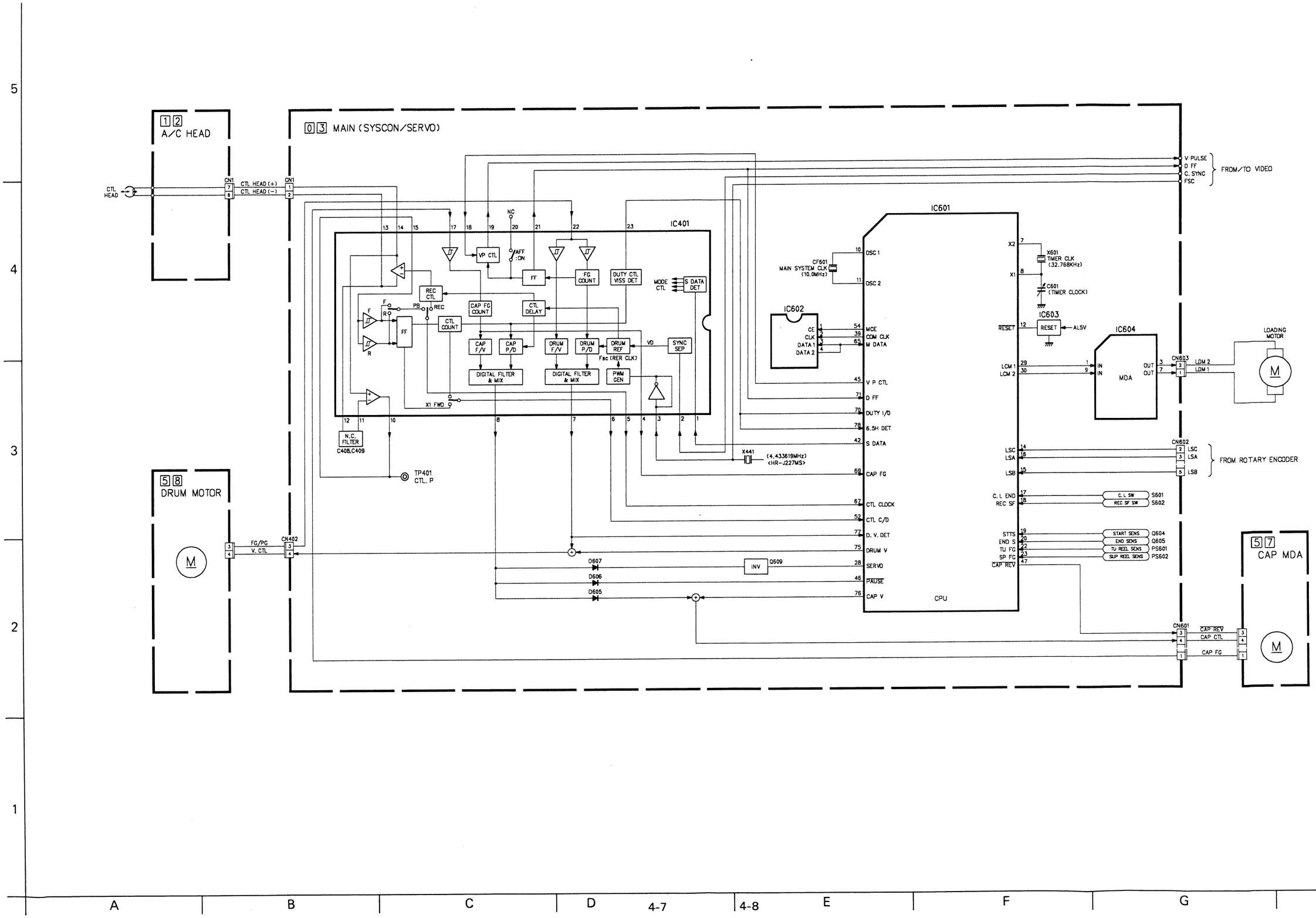
NO	NAME

NOTE : Mark (*) is not used.

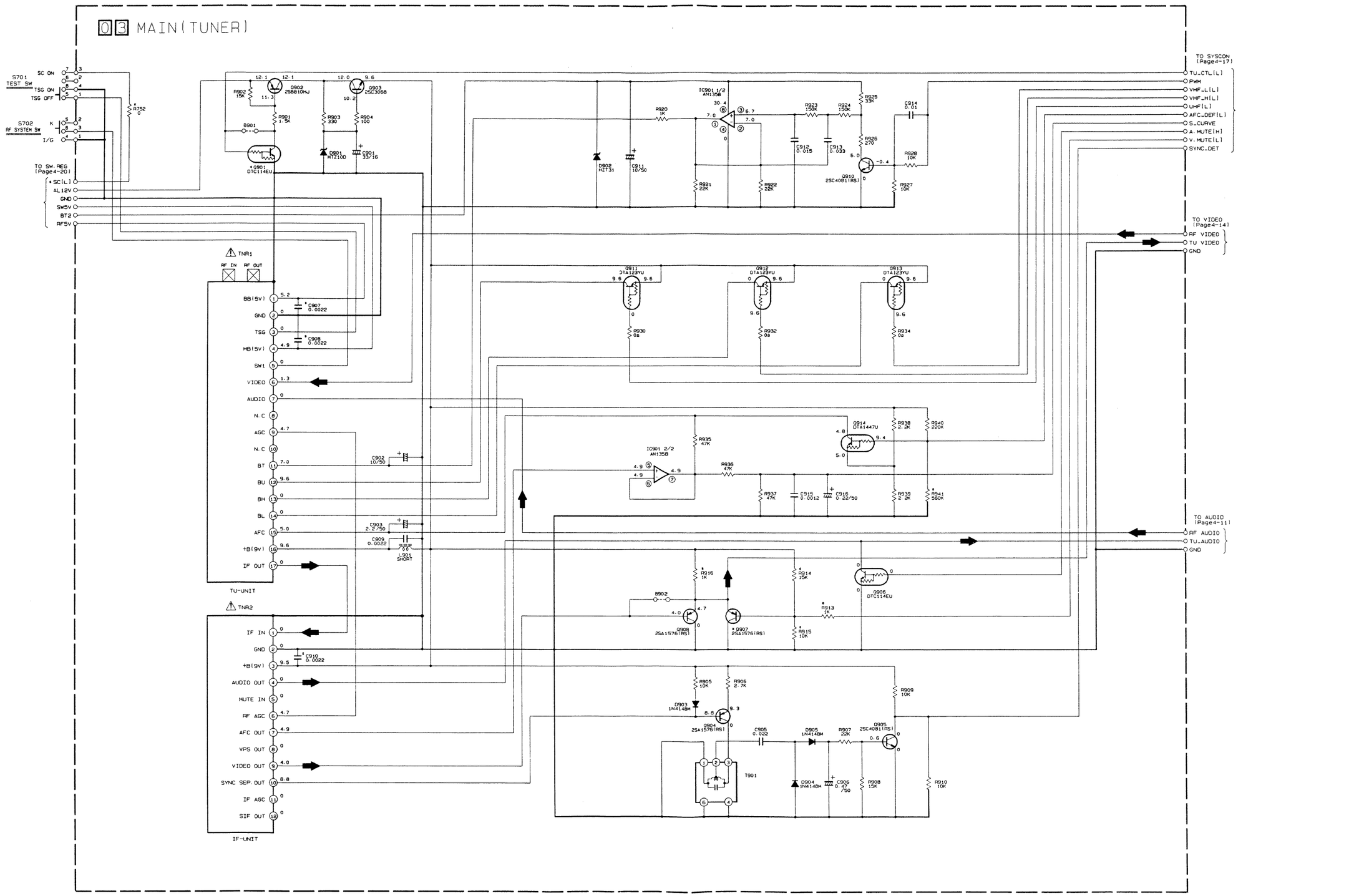
4.2 VIDEO BLOCK DIAGRAM



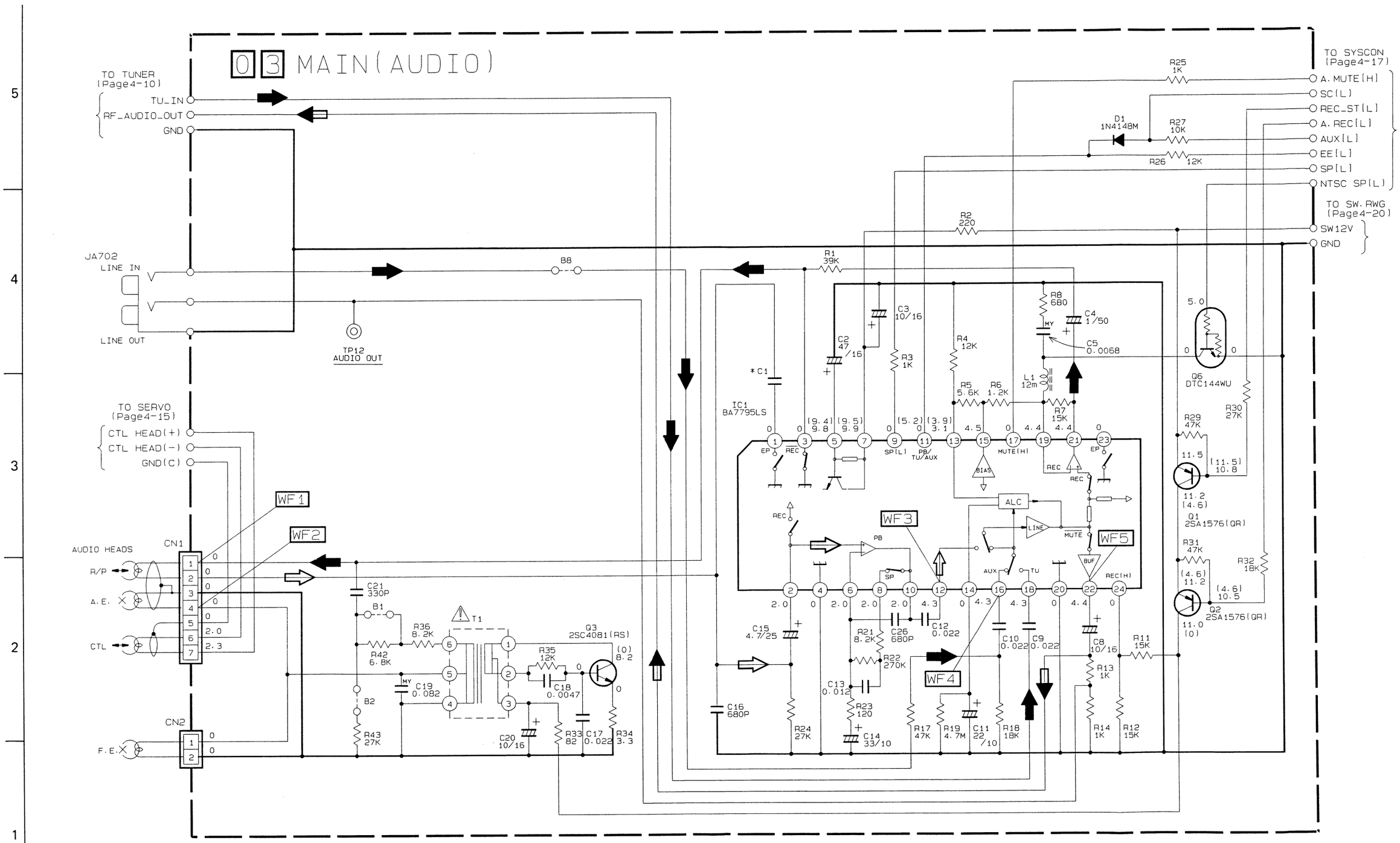
4.3 SYSCON/SERVO BLOCK DIAGRAM



4.4 TUNER/IF SCHEMATIC DIAGRAM

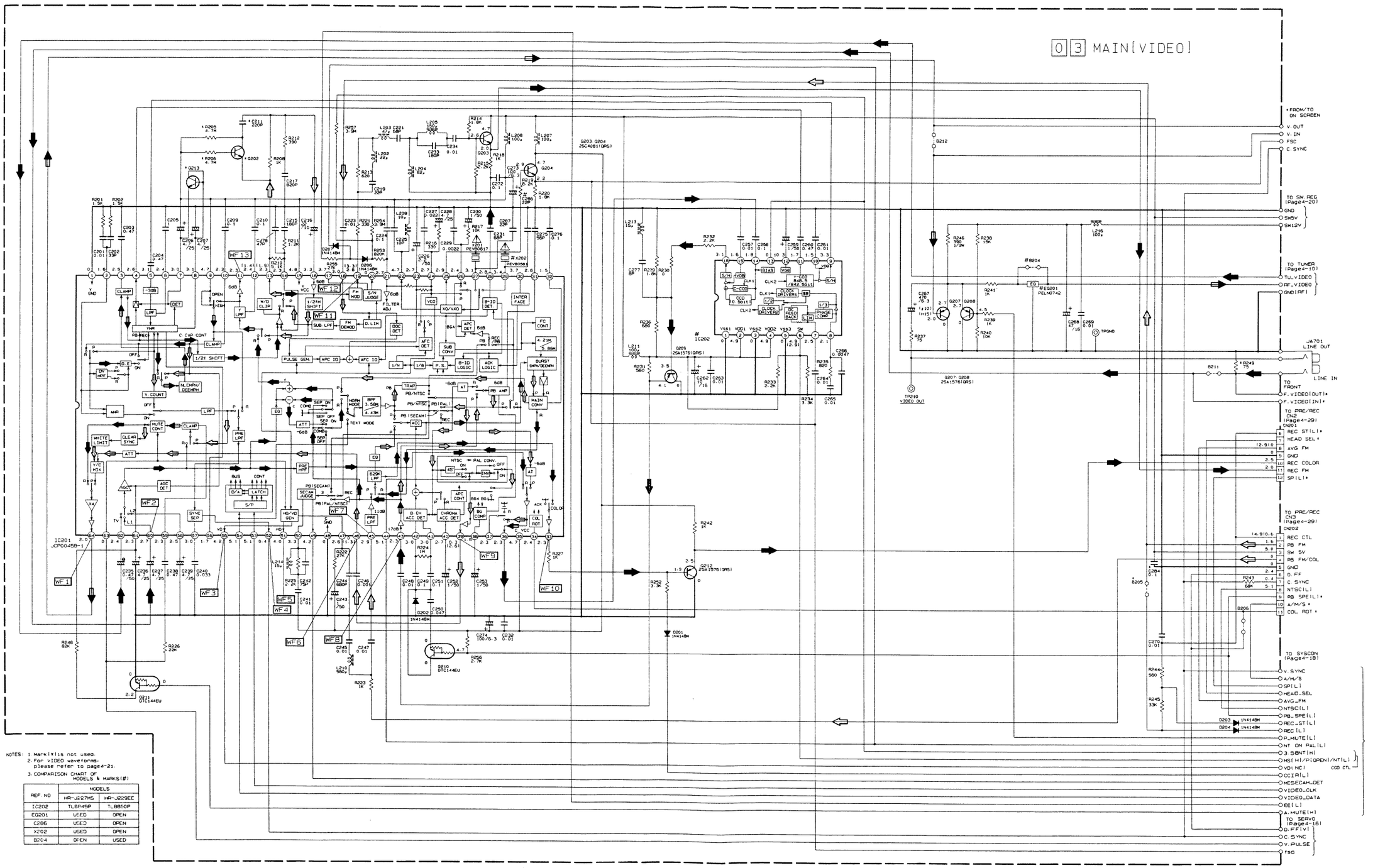


4.5 AUDIO SCHEMATIC DIAGRAM



NOTES: 1. Mark(*)is not used.
2. For AUDIO waveforms, please refer to page4-21.

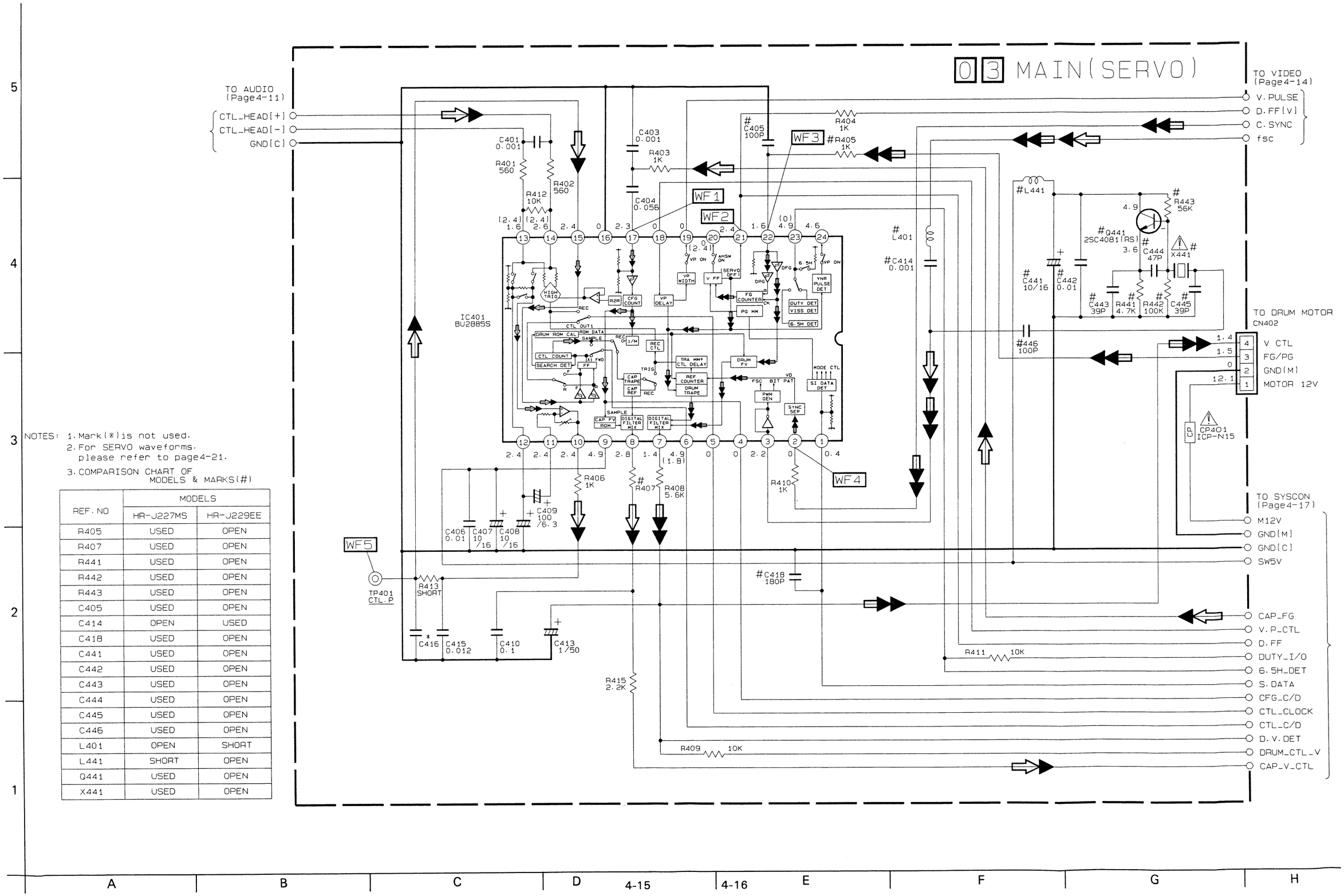
4.6 VIDEO SCHEMATIC DIAGRAM



NOTES: 1. Mark(*)is not used.
2. For VIDEO waveforms, please refer to Page4-21.
3. COMPARISON CHART OF MODELS & MARKS(#)

REF. NO.	MODELS	
	HR-J627MS	HR-J629EE
IC202	TLB149P	TLB850P
EQ201	USED	OPEN
C286	USED	OPEN
X202	USED	OPEN
B204	OPEN	USED

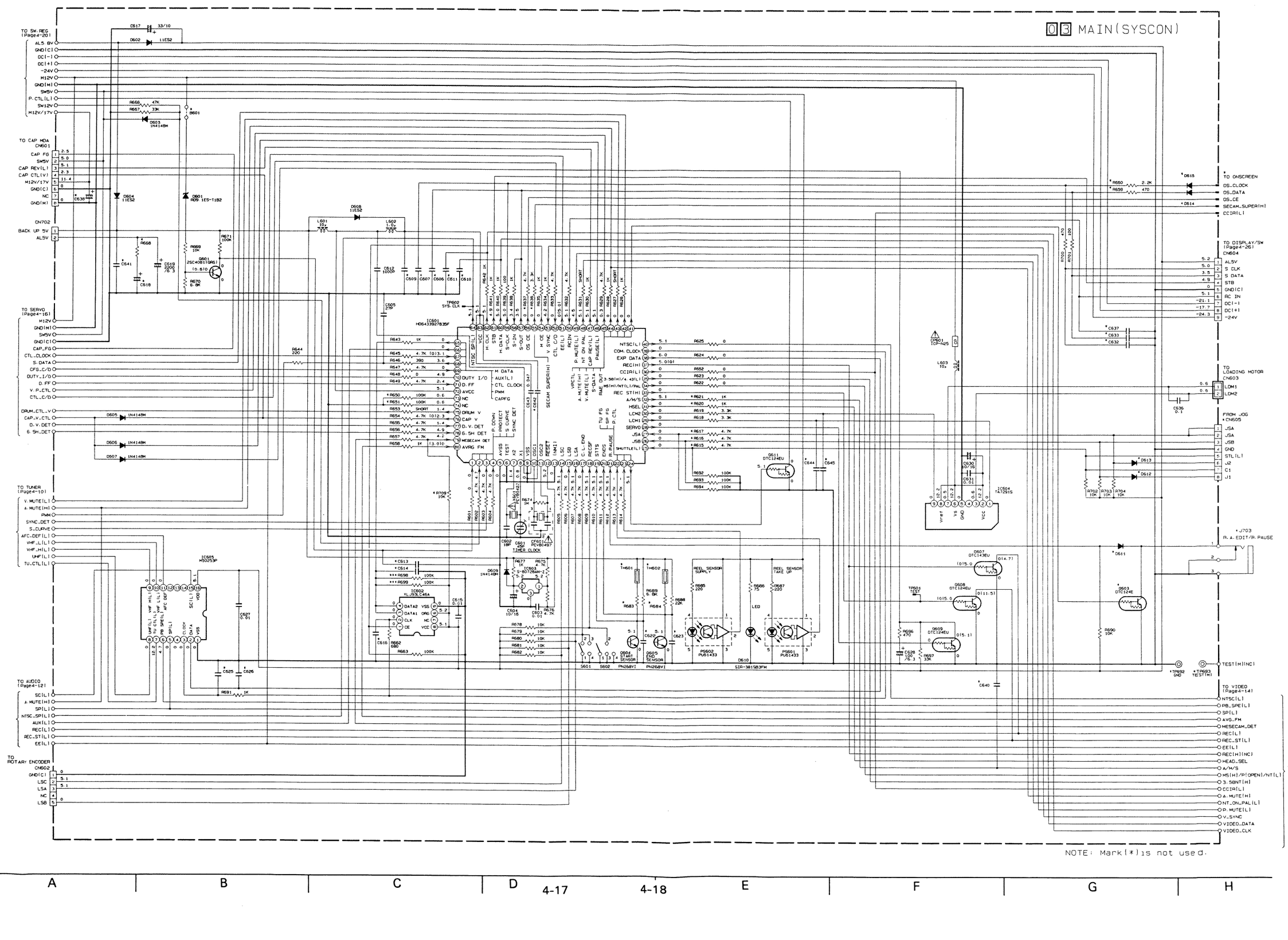
4.7 SERVO SCHEMATIC DIAGRAM



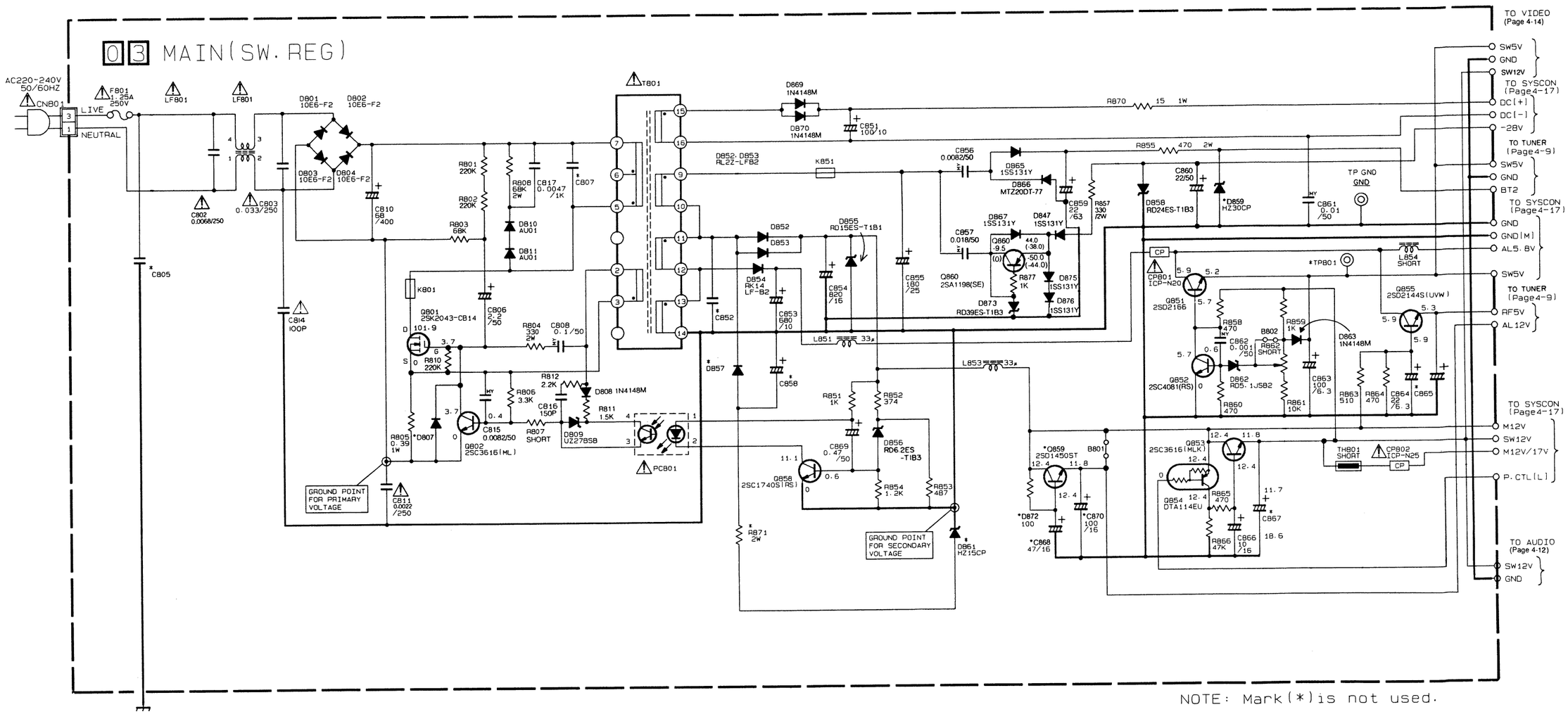
NOTES: 1. Mark(※)is not used.
2. For SERVO waveforms. please refer to page4-21.
3. COMPARISON CHART OF MODELS & MARKS(#)

REF. NO	MODELS	
	HR-J227MS	HR-J229EE
R405	USED	OPEN
R407	USED	OPEN
R441	USED	OPEN
R442	USED	OPEN
R443	USED	OPEN
C405	USED	OPEN
C414	OPEN	USED
C418	USED	OPEN
C441	USED	OPEN
C442	USED	OPEN
C443	USED	OPEN
C444	USED	OPEN
C445	USED	OPEN
C446	USED	OPEN
L401	OPEN	SHORT
L441	SHORT	OPEN
Q441	USED	OPEN
X441	USED	OPEN

4.8 SYSTEM CONTROL SCHEMATIC DIAGRAM



4.9 SWITCHING REGULATOR SCHEMATIC DIAGRAM



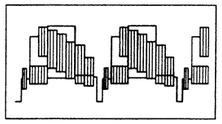
NOTE: Mark(*)is not used.

4.10 MAIN AND A/C HEAD CIRCUIT BOARDS

WAVEFORMS

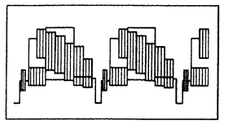
—VIDEO—

WF1 IC201-64



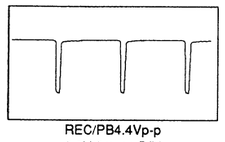
REC/PB2.0Vp-p
50mV/20µsec/DIV

WF2 IC201-60



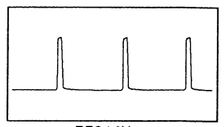
REC1.0Vp-p
20mV/20µsec/DIV

WF3 IC201-55



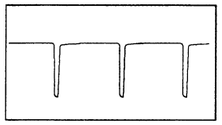
REC/PB4.4Vp-p
0.2V/5msec/DIV

WF4 IC201-52



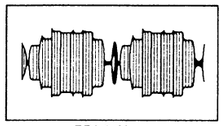
REC4.0Vp-p
0.1V/20µsec/DIV

WF5 IC201-51



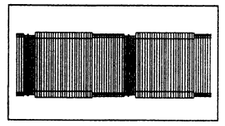
REC4.2Vp-p
0.1V/20µsec/DIV

WF6 IC201-46



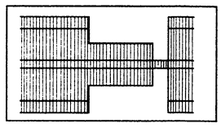
PB0.84Vp-p
20mV/20µsec/DIV

WF7 IC201-45



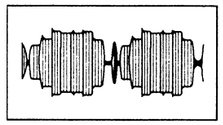
PB0.3Vp-p
10mV/5msec/DIV

WF8 IC201-43



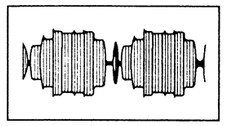
REC0.08Vp-p/PB0.15Vp-p
5mV/5msec/DIV

WF9 IC201-39



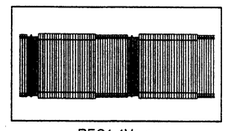
PB0.8Vp-p
20mV/20µsec/DIV

WF10 IC201-33



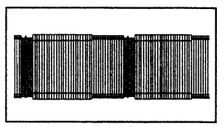
REC0.26Vp-p
10mV/20µsec/DIV

WF11 IC201-19



REC1.4Vp-p
50mV/5msec/DIV

WF12 IC201-18



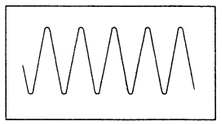
PB0.42Vp-p
10mV/5msec/DIV

WF13 IC201-11

REC/PB1.0Vp-p
50mV/20µsec/DIV

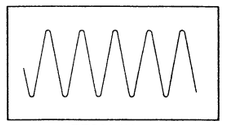
—AUDIO—

WF1 CN1-1



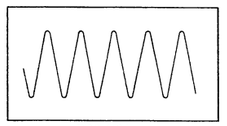
REC44.0Vp-p
2.0V/20µsec/DIV

WF2 CN1-4



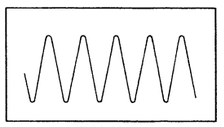
REC36.0Vp-p
2.0V/20µsec/DIV

WF3 IC1-12



PB0.13Vp-p
5mV/1msec/DIV

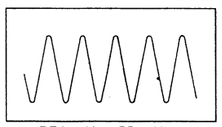
WF4 IC1-16



REC0.22Vp-p
10mV/1msec/DIV

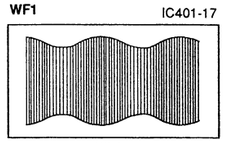
—SERVO—

WF5 IC1-22



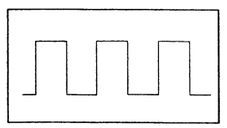
REC2.4Vp-p/PB3.2Vp-p
0.1V/1msec/DIV

WF1 IC401-17



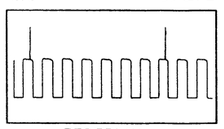
REC2.1Vp-p
50mV/10msec/DIV

WF2 IC401-21 D.FF



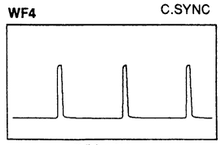
REC/PB5.6Vp-p
0.2V/10msec/DIV

WF3 IC401-22 D.PG/FG



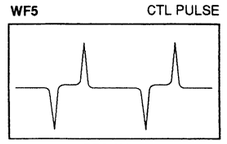
REC/PB5.0Vp-p
0.1V/5msec/DIV

WF4 IC401-2 C.SYNC



REC4.0Vp-p
0.1V/20µsec/DIV

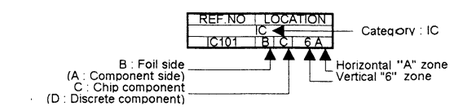
WF5 TP401 CTL PULSE

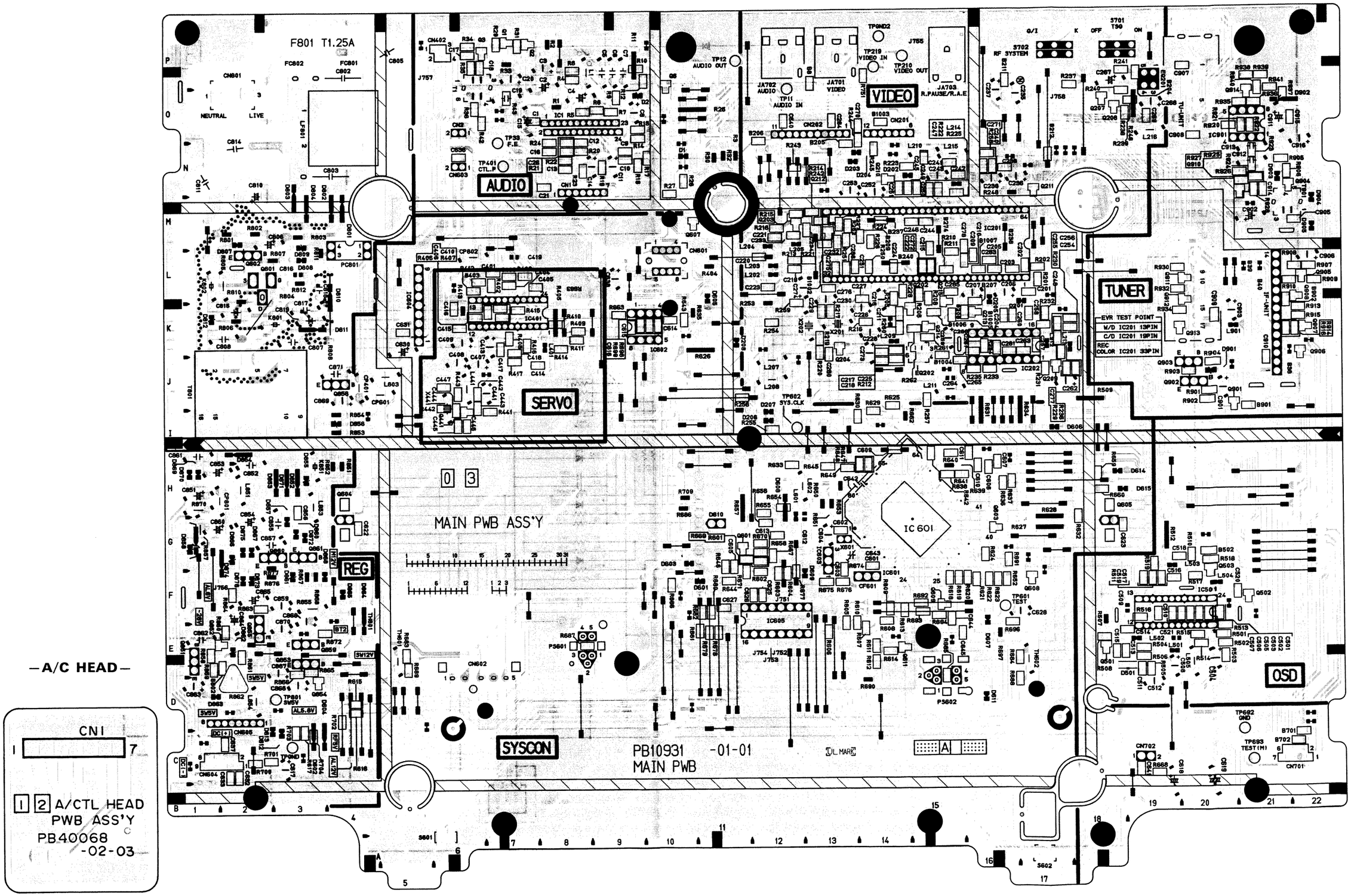


PB3.2Vp-p
0.1V/10msec/DIV

COMPONENT PARTS LOCATION GUIDE

REF.NO	LOCATION	REF.NO	LOCATION	REF.NO	LOCATION	REF.NO	LOCATION	REF.NO	LOCATION	REF.NO	LOCATION	REF.NO	LOCATION
CAPACITOR		C408	A D 6J	C901	A D 20J	IC602	A D 19K	R23	B C 8N	R601	B C 12G	R811	A D 3L
C1	B C 17O	C409	A D 6K	C902	A D 21M	IC603	A D 13F	R24	B C 8N	R602	B C 12F	R812	A D 3L
C2	A D 8P	C410	B C 7K	C903	A D 20K	IC604	A D 5K	R25	A D 10O	R603	B C 12F	R851	A D 4I
C3	A D 8P	C413	A D 7K	C905	B C 22M	IC605	A D 11F	R26	B C 10N	R604	B C 12F	R852	A D 4H
C4	A D 9O	C414	B C 8J	C906	A D 22L	IC901	A D 21N	R27	B C 10N	R605	B C 13E	R853	A D 4I
C5	A D 9P	C415	B C 6K	C907	B C 20P	COIL		R29	B C 7P	R606	B C 13E	R854	A D 4I
C6	A D 9P	C416	B C 6K	C908	B C 20O	L1	A D 8P	R30	A D 11N	R607	B C 14E	R855	A D 3F
C7	A D 9P	C417	B C 7K	C909	B C 20K	L202	A D 12L	R31	B C 7P	R608	B C 14E	R857	A D 1G
C8	A D 9O	C418	B C 7K	C910	B C 21J	L203	A D 12L	R32	A D 11N	R609	B C 14F	R858	B C 1E
C9	B C 9N	C419	A D 7L	C911	A D 21O	L204	A D 12M	R33	A D 7P	R610	B C 14E	R859	B C 1E
C10	B C 9N	C441	A D 7J	C912	A D 21N	L205	A D 12M	R34	B C 6P	R611	B C 14E	R860	B C 2E
C11	A D 9N	C442	B C 6J	C913	A D 21N	L207	A D 12J	R35	B C 6P	R612	B C 14E	R861	B C 2E
C12	B C 8N	C443	B C 6J	C914	B C 21M	L208	A D 12J	R36	B C 6O	R613	B C 14F	R862	A D 2D
C13	B C 8N	C444	B C 6I	C915	B C 22O	L209	A D 14K	R42	B C 7O	R614	B C 14E	R863	B C 2F
C14	A D 9N	C445	B C 6I	C916	A D 22N	L210	A D 15N	R43	B C 7O	R615	B C 4D	R864	B C 2F
C15	A D 7O	C446	B C 6I	CONNECTOR		L211	A D 15J	R201	B C 17L	R616	B C 4D	R865	B C 3E
C16	B C 8N	C447	B C 6J	CN1	A D 8N	L212	A D 17J	R202	B C 17L	R617	B C 3C	R866	B C 3E
C17	B C 6P	C501	B C 20F	CN2	A D 6O	L213	A D 18J	R205	B C 14L	R618	B C 15F	R867	A D 3F
C18	B C 6P	C502	B C 20F	CN201	A D 15O	L214	A D 15N	R206	B C 15L	R619	B C 15F	R868	A D 3F
C19	A D 7O	C503	B C 20F	CN202	A D 13O	L215	A D 15N	R208	B C 15L	R620	B C 16F	R870	A D 1H
C20	A D 7P	C504	A D 20E	CN402	A D 6P	L216	A D 19O	R210	B C 15L	R621	B C 16F	R872	B C 4E
C21	B C 8N	C505	B C 20F	CN601	A D 10L	L401	A D 8J	R211	B C 15L	R622	B C 16F	R876	A D 3F
C26	B C 8N	C506	B C 20F	CN602	A D 6D	L441	A D 6J	R212	B C 14J	R623	B C 16F	R877	A D 3G
C201	B C 17L	C507	B C 19F	CN603	A D 6N	L501	A D 20E	R213	B C 12L	R624	B C 16G	R901	B C 20J
C202	B C 17L	C508	A D 19E	CN604	A D 2C	L502	A D 19E	R214	B C 13M	R625	B C 14J	R902	B C 20J
C203	B C 16L	C509	A D 19F	CN605	A D 2D	L503	A D 20F	R215	B C 12M	R626	A D 10K	R903	B C 20J
C204	B C 16K	C510	B C 19F	CN701	A D 22C	L504	A D 20F	R216	B C 14K	R627	A D 17G	R904	B C 20J
C205	B C 16L	C511	B C 19E	CN702	A D 19C	L505	A D 20E	R217	B C 13K	R628	A D 17G	R905	B C 21N
C206	A D 16L	C512	A D 19D	CN801	A D 2O	L601	A D 12G	R218	B C 12M	R629	B C 14I	R906	B C 22N
C207	A D 16L	C513	B C 19E	CP		L602	A D 13H	R219	B C 13K	R630	B C 14I	R907	B C 22L
C209	B C 16L	C514	B C 19E	CP401	A D 4J	L603	A D 5J	R220	B C 13K	R631	A D 16I	R908	B C 22L
C210	B C 16L	C515	B C 18E	CP601	A D 4J	L851	A D 2H	R221	B C 13L	R632	B C 18G	R909	B C 22L
C211	B C 15L	C516	B C 19F	CP801	A D 2H	L853	A D 3H	R222	B C 15N	R633	B C 12H	R910	B C 22L
C215	B C 15L	C517	B C 19F	CP802	A D 6L	L854	A D 2D	R223	B C 14N	R634	A D 17I	R913	B C 22K
C216	A D 14L	C518	B C 20G	DIODE		L901	A D 20K	R224	B C 14M	R635	A D 10K	R914	B C 22K
C217	B C 14K	C519	B C 19F	D1	A D 10N	TRANSISTOR		R225	B C 15M	R636	B C 16H	R915	B C 22K
C218	B C 14J	C520	B C 21F	D2	A D 10O	Q1	B C 7P	R226	B C 14M	R637	B C 16H	R916	B C 21K
C219	B C 12L	C521	A D 20E	D201	A D 17K	Q2	B C 7P	R227	B C 13M	R638	B C 15H	R920	B C 20O
C220	B C 12L	C601	A D 13G	D202	A D 15N	Q3	B C 13G	R228	B C 14M	R639	A D 15H	R921	B C 21O
C221	B C 12M	C602	B C 13G	D203	A D 14N	Q6	B C 10P	R229	B C 17J	R640	B C 15I	R922	B C 21O
C222	B C 15L	C603	B C 13F	D204	A D 14N	Q202	B C 15K	R230	B C 17K	R641	B C 15H	R923	B C 21N
C223	B C 12L	C604	A D 13G	D205	A D 16L	Q203	B C 12M	R231	B C 17J	R642	B C 15I	R924	B C 21N
C224	B C 14L	C605	B C 11G	D206	A D 12I	Q204	B C 13K	R232	B C 17K	R643	B C 10K	R925	B C 21N
C225	B C 14K	C606	B C 16H	D207	A D 11F	Q205	B C 18O	R233	B C 16J	R644	B C 11F	R926	B C 21N
C226	A D 14K	C607	B C 16H	D208	A D 11K	Q208	B C 18O	R234	B C 16K	R645	B C 13H	R927	B C 21N
C227	B C 14L	C609	B C 14I	D501	B C 19E	Q209	B C 17J	R235	B C 16J	R646	B C 11G	R928	B C 21M
C228	A D 14K	C610	B C 16H	D601	A D 11F	Q210	B C 17N	R236	B C 18J	R647	B C 14H	R930	B C 20L
C229	B C 13K	C611	B C 16I	D602	A D 3D	Q211	B C 17N	R237	B C 18O	R648	B C 14H	R932	B C 20L
C230	A D 13L	C612	A D 13G	D603	A D 11G	Q212	B C 13M	R238	B C 19O	R649	B C 13H	R934	B C 20K
C231	B C 14L	C613	B C 12G	D604	A D 3D	Q213	B C 16K	R239	B C 19O	R650	A D 13H	R935	B C 21O
C232	B C 13M	C614	B C 10K	D605	A D 11L	Q214	B C 15K	R240	B C 18O	R651	A D 13H	R936	B C 21O
C233	B C 12M	C615	B C 9K	D606	A D 17I	Q215	B C 15K	R241	B C 18P	R652	B C 16F	R937	B C 21O
C234	B C 13M	C616	B C 9K	D607	A D 16F	Q441	B C 6I	R242	B C 13M	R653	A D 13H	R938	B C 21P
C235	A D 17O	C617	A D 3C	D608	A D 12G	Q501	B C 18E	R243	B C 12N	R654	B C 12H	R939	B C 21P
C236	A D 17N	C618	A D 19C	D609	A D 13G	Q502	B C 21F	R244	B C 14N	R655	B C 12H	R940	B C 21O
C237	A D 16O	C619	A D 20C	D610	A D 11G	Q503	B C 20F	R245	B C 14N	R656	B C 12G	R941	B C 21O
C238	B C 16N	C622	B C 4G	D611	A D 16D	Q601	B C 11G	R246	A D 19O	R657	A D 11G	TEST POINT	
C239	A D 16N	C623	B C 18G	D612	A D 3D	Q603	B C 16G	R248	A D 16M	R658	B C 12G	TP11	A D 12O
C240	B C 16N	C625	B C 12F	D613	A D 3D	Q604	A D 4G	R250	B C 14L	R659	B C 18H	TP12	A D 11P
C241	B C 15N	C626	B C 12F	D614	A D 19H	Q605	A D 18G	R251	B C 13M	R660	B C 18H	TP33	A D 7N
C242	B C 15N	C627	B C 11F	D615	A D 19H	Q607	B C 10M	R252	B C 14M	R662	A D 14I	TP210	A D 14P
C243	A D 15N	C628	A D 17F	D801	A D 4M	Q608	B C 17F	R253	A D 12K	R663	B C 9K	TP219	A D 14P
C244	B C 15M	C630	A D 5K	D802	A D 4N	Q609	B C 15F	R254	B C 12K	R666	B C 10F	TP401	A D 7N
C245	B C 15N	C631	B C 5K	D803	A D 3M	Q611	B C 14E	R255	B C 12I	R667	B C 12G	TP601	A D 16F
C246	B C 15M	C632	B C 2C	D804	A D 3N	Q801	A D 3L	R256	B C 11J	R668	B C 19C	TP602	A D 12I
C247	B C 15N	C633	B C 2C	D807	A D 2M	Q802	A D 2L	R257	B C 15J	R669	B C 11G	TP692	A D 21C
C248	B C 17K	C636	B C 6N	D808	A D 3L	Q851	A D 1E	R258	B C 16N	R670	B C 12G	TP693	A D 21C
C249	B C 15N	C637	B C 2C	D809	A D 3M	Q852	B C 2E	R259	B C 12K	R671	B C 11F	TP801	A D 3D
C250	B C 15N	C638	A D 9L	D810	A D 4K	Q853	A D 3E	R260	B C 14K	R674	B C 14G	TPGND2	A D 14P
C251	B C 14N	C640	B C 12O	D811	A D 3K	Q854	B C 3D	R261	B C 15K	R675	B C 13F	TPGND	A D 3C
C252	A D 14N	C641	B C 19C	D812	A D 1K	Q855	A D 2E	R262	B C 15K	R676	B C 13F	OTHERS	
C253	A D 14N	C642	A D 14G	D852	A D 3I	Q858	A D 4J	R402	B C 7L	R677	B C 12F	CF601	A D 14F
C254	B C 18K	C643	A D 14G	D853	A D 3I	Q859	A D 3E	R403	B C 7L	R678	B C 11E	EQ201	A D 19P
C255	B C 17K	C644	B C 15F	D854	A D 2I	Q860	A D 2G	R404	A D 11L	R679	B C 11E	EQ202	A D 15K
C256	B C 18K	C645	B C 15E	D855	A D 3H	Q861	A D 3G	R405	A D 8K	R680	B C 11F	IF-UNIT	A D 21J
C257	B C 17K	C802	A D 4P	D856	A D 4I	Q901	B C 21I	R406	B C 6K	R681	B C 11E	JA701	A D 13P
C258	B C 17K	C803	A D 4N	D857	A D 3H	Q902	A D 20J	R407	B C 7K	R682	B C 11F	JA702	A D 12P
C259	A D 15K	C805	A D 4P	D858	A D 1G	Q903	A D 20J	R408	B C 7K	R683	B C 5E	JA703	A D 15P
C260	B C 16K	C806	A D 3M	D860	A D 3G	Q904	B C 22N	R409	B C 8K	R684	B C 17E	K801	A D 3K
C261	B C 16K	C807	A D 3K	D861	A D 3G	Q905	B C 22L	R410	B C 8K	R685	B C 15D	K802	A D 1L
C262	A D 18J	C808	A D 2K	D862	A D 2E	Q906	B C 22J	R411	B C 8K	R686	A D 10H	K851	A D 3H
C263	B C 17K	C810	A D 2N	D863	A D 2D	Q907	B C 22K	R412	B C 6L	R687	B C 8E	LF801	A D 3N
C264	A D 15J	C811	A D 1M	D864	A D 4F	Q908	B C 22K	R413	A D 6K	R688	B C 17D	PC801	A D 4M
C265	B C 15J	C814	A D 2N	D865	A D 4F	Q910	B C 21M	R414	B C 8K	R689	B C 5E	PS601	A D 8E
C266	B C 16K	C815	A D 2K	D866	A D 2G	Q911	B C 20L	R415	B C 7K	R690	A D 14D	PS602	A D 15D
C267	A D 18P	C816	A D 3L	D867	A D 2G	Q912	B C 20K	R416	B C 7K	R691	B C 16G	S601	A D 6A
C268	A D 19O	C817	A D 3K	D868	A D 4G	Q913	B C 20K	R417	B C 7J	R692	B C 15F	S602	A D 17A
C269	B C 19O	C818	A D 3L	D869	A D 1H	Q914	B C 21O	R441	B C 7I	R693	B C 15F	S701	A D 18P
C270	B C 14O	C819	A D 3K	D870	A D 1H	RESISTOR		R442	B C 6J	R694	B C 15F	S702	A D 17P
C271	B C 16N	C851	A D 1H	D871	A D 3I	R1	A D 8O	R443	B C 6J	R696	B C 16E	T1	A D 6P
C272	B C 15L	C852	A D 2H	D872	A D 3G	R2	A D 8P	R501	B C 20E	R697	A D 16E	T801	A D 1J
C273	A D 14K	C853	A D 2H	D873	A D 2F	R3	A D 11N	R502	B C 20E	R698	B C 10K	T901	A D 22M
C274	A D 13L	C854	A D 2G	D874	A D 2G	R4	B C 8P	R503	B C 20E	R699	B C 10K	TH601	A D 5E
C275	B C 13L	C855	A D 3G	D875	A D 2G	R5	B C 8O	R504	B C 19E	R700	B C 2C	TH602	A D 17E
C276	B C 13L	C856	B C 3H	D876	A D 2F	R6	B C 9O	R505	B C 19E	R701	B C 2C	TH801	A D 4E
C277	B C 17J	C857	A D 3G	D901	A D 20J	R7	B C 9O	R506	B C 19E	R702	B C 4D	TU-UNIT	A D 20P
C278	B C 16L	C859	A D 3F	D902	A D 22O	R8	B C 8P	R507	A D 18E	R703	B C 3C	X201	A D 13K
C280	B C 13J	C860	A D 2G	D903	A D 21N	R9	B C 9O	R508	B C 18E	R704	B C 3C	X202	A D 13K
C281	B C 16K	C861	A D 1I	D904	A D 22M	R10	B C 9P	R509	A D 18J	R709	A D 10H	X441	A D 6I
C283	B C 16L	C862	A D 1E	D905	A D 22M	R11	B C 9P	R510	B C 20G	R751	B C 14P	X601	A D 13G
C284	B C 13O	C863	A D 1D	FUSE		R12	B C 10P	R511	B C 19F	R801	A D 2M		
C285	B C 15L	C864	A D 2F	F801	A D 4P	R13	B C 9O	R512	A D 19G	R802	A D 2M		
C286	B C 13L	C865	A D 2F		C	R14	B C 9O	R513	B C 20E	R803	A D 3M		
C401	B C 7L	C866	A D 3D	IC1	A D 8O	R17	B C 10N	R514	B C 20E	R804	A D 2K		
C403	B C 7L	C867	A D 3E	IC201	A D 17L	R18	B C 9N	R515	B C 20E	R805	A D 2L		
C404	B C 7L	C868	A D 3F	IC202	A D 17J	R19	B C 9N	R516	B C 19F	R806	A D 2K		
C405	B C 8L	C869	A D 4J	IC401	A D 8K	R20	B C 8N	R517	B C 20F	R807	A D 2L		
C406	B C 7K	C870	A D 3E	IC501	A D 20E	R21	B C 8N	R518	B C 20G	R808	A D 4K		
C407	A D 7J	C871	A D 4J	IC601	B C 15G	R22	B C 8N	R519	B C 19G	R810	A D 2L		




F801 T1.25A
AUDIO
VIDEO
TUNER
SERVO
REG
SYSCON
OSD
MAIN PWB ASS'Y
IC 601
PB10931 -01-01
MAIN PWB
NEUTRAL
LIVE
EVR TEST POINT
W/D IC201 13PIN
C/D IC201 19PIN
REC
COLOR IC201 33PIN

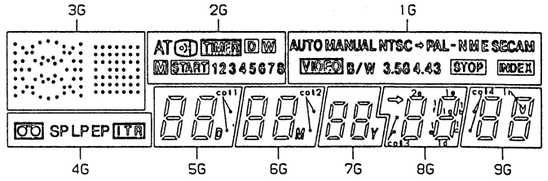
—A/C HEAD—

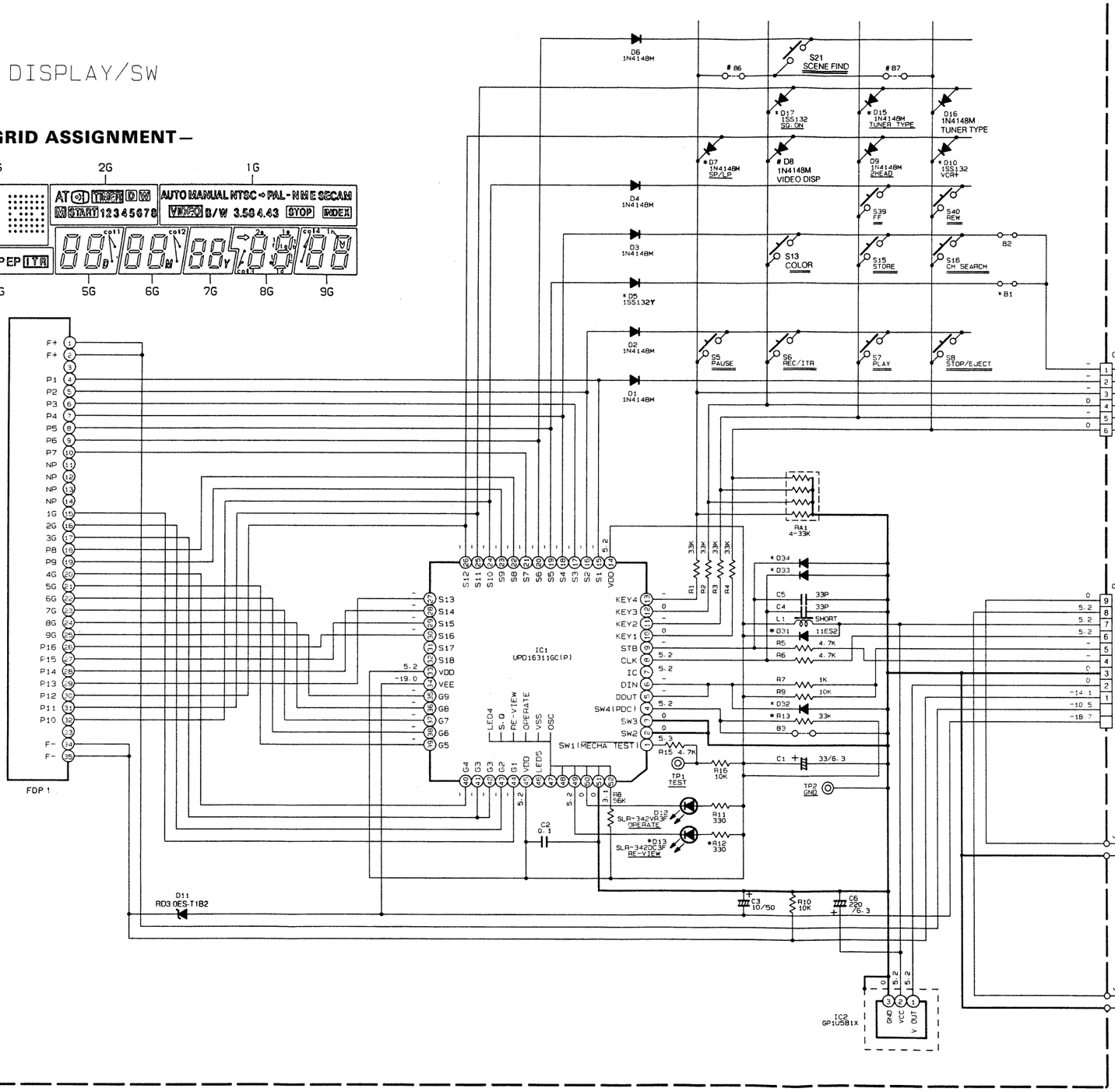
CN1
1
7
1 2 A/CTL HEAD
PWB ASS'Y
PB40068
-02-03

4.11 DISPLAY/SW & SW/JACK SCHEMATIC DIAGRAMS

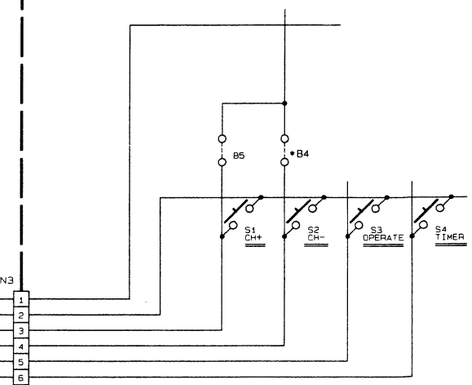
28 DISPLAY/SW

–FDP GRID ASSIGNMENT–





36 SW/JACK



COMPARISON CHART OF MODELS & MARKS(#)

REF. NO.	MODELS	
	HR-J227MS	HR-J229EE
D8	USED	OPEN
B6	OPEN	USED
B7	USED	OPEN

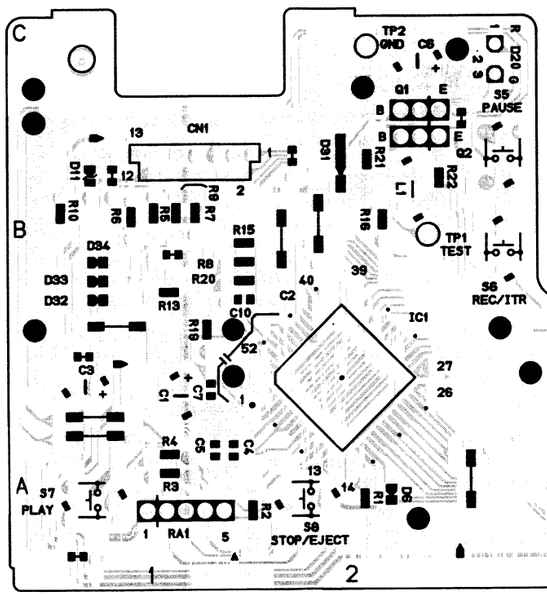
NOTE: Mark(*)is not used.

4.12 DISPLAY/SW, SW/JACK, REC SAFETY AND CASSETTE SW CIRCUIT BOARDS

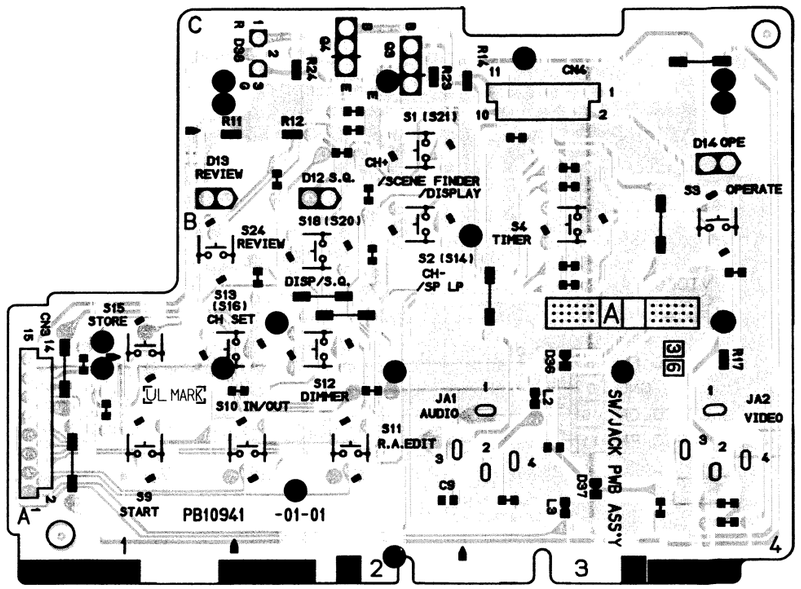
MAIN COMPONENT PARTS LOCATION GUIDE <DISPLAY/SW PWB>

REF.No.	LOCATION	REF.No.	LOCATION	REF.No.	LOCATION
IC		D5	8A	CONNECTOR	
IC1	2A	D6	2A	CN1	1B
IC2	9A	D8	7A	CN2	9A
DIODE		D9	7A	TEST POINT	
D1	9A	D11	7A	TP1	2B
D2	9A	D32	1B	TP2	2C
D3	9A	D33	1B		
D4	9A	D34	1B		

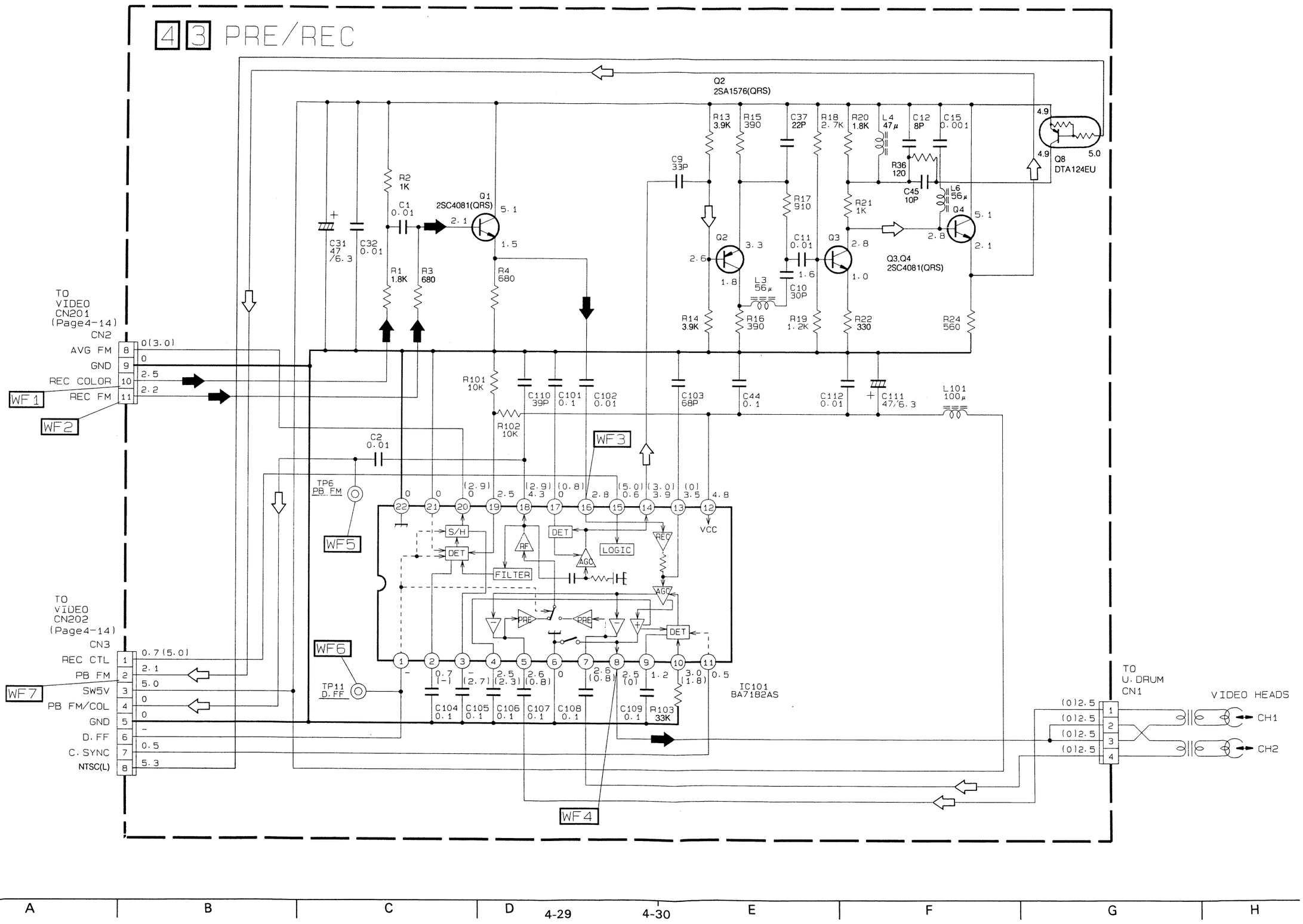
— DISPLAY/SW —



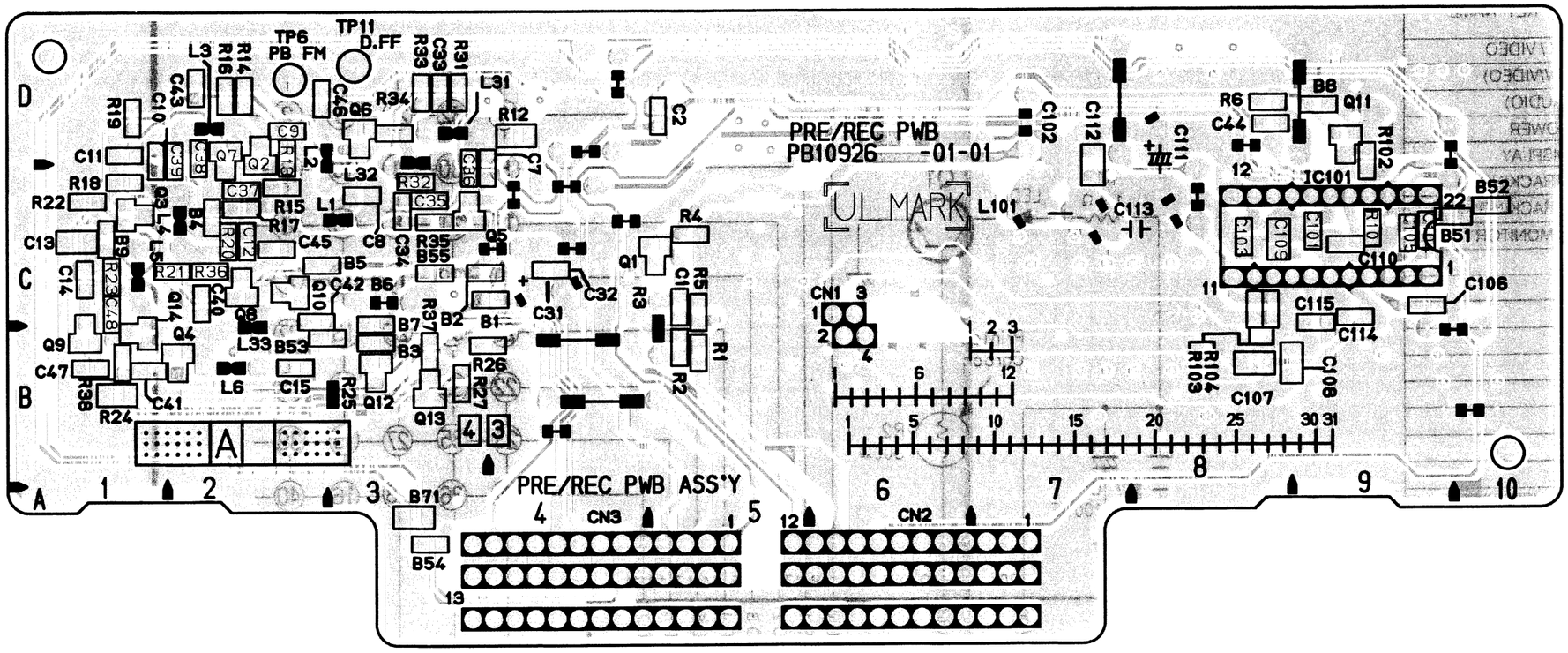
— SW/JACK —



4.13 PRE/REC SCHEMATIC DIAGRAM



4.14 PRE/REC CIRCUIT BOARD



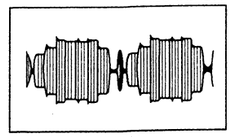
LEADLESS COMPONENT PARTS LOCATION GUIDE <PRE/REC PWB>

MAIN COMPONENT PARTS LOCATION GUIDE

REF.No.	LOCATION
TRANSISTOR	
Q1	5C
Q2	2D
Q3	1C
Q4	2B
Q5	3C
Q6	3D
Q7	2D
Q8	2C
Q9	1B
Q10	2C
Q11	9D
Q12	3B
Q13	3B
Q14	1B
RESISTOR	
R1	5B
R2	5B
R4	5C
R5	5C
R6	8D
R12	4D
R13	2D
R14	2D
R15	2C
R16	2D
R17	2C
R18	1C
R19	1D
R20	2C
R21	2C
R22	1C
R23	1C
R24	1B
R26	3B
R27	3B
R31	3D
R32	3C
R33	3D
R34	3D
R35	3C
R37	3B
R101	9C
R102	9D
R103	8B
R104	8B
CAPACITOR	
C1	5C
C2	5D
C5	2C
C7	4D
C8	3C
C9	2D
C10	1D
C11	1D
C12	2C
C13	1C
C14	1C
C15	2B
C32	4C
C33	3D
C34	3C
C35	3C
C36	3C
C37	2C
C38	2D
C39	2D
C40	2C
C41	1B
C42	3C
C43	2D
C44	8D
C101	9C
C103	8C
C104	9C
C105	9C
C106	9C
C107	8B
C108	8B
C109	8C
C110	9C
C112	7D
C114	9C
C115	9C
IC	
IC101	9C
TRANSISTOR	
Q1	5C
Q2	2D
Q3	1C
Q4	2B
CONNECTOR	
CN1	6C
CN2	6A
CN3	4A
TEST POINT	
TP6	2D
TP11	3D

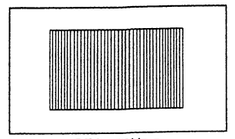
WAVEFORMS
— PRE/REC —

CN2-10
WF1 REC COLOR



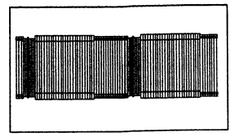
REC0.28Vp-p
10mV/20μsec/DIV

CN2-11
WF2 REC FM



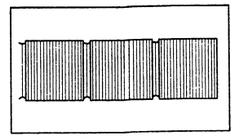
REC0.76Vp-p
20mV/5msec/DIV

WF3 IC101-16



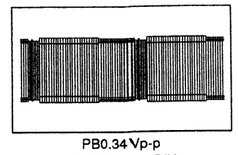
REC0.28Vp-p
10mV/5msec/DIV

WF4 IC101-8



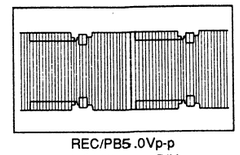
REC2.3Vp-p
50mV/5msec/DIV

TP6
WF5 PB FM



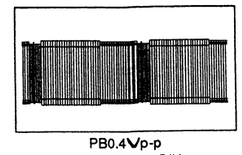
PB0.34Vp-p
10mV/5msec/DIV

TP11
WF6 D.FF



REC/PB5.0Vp-p
0.2V/10msec/DIV

CN3-2
WF7 PB FM

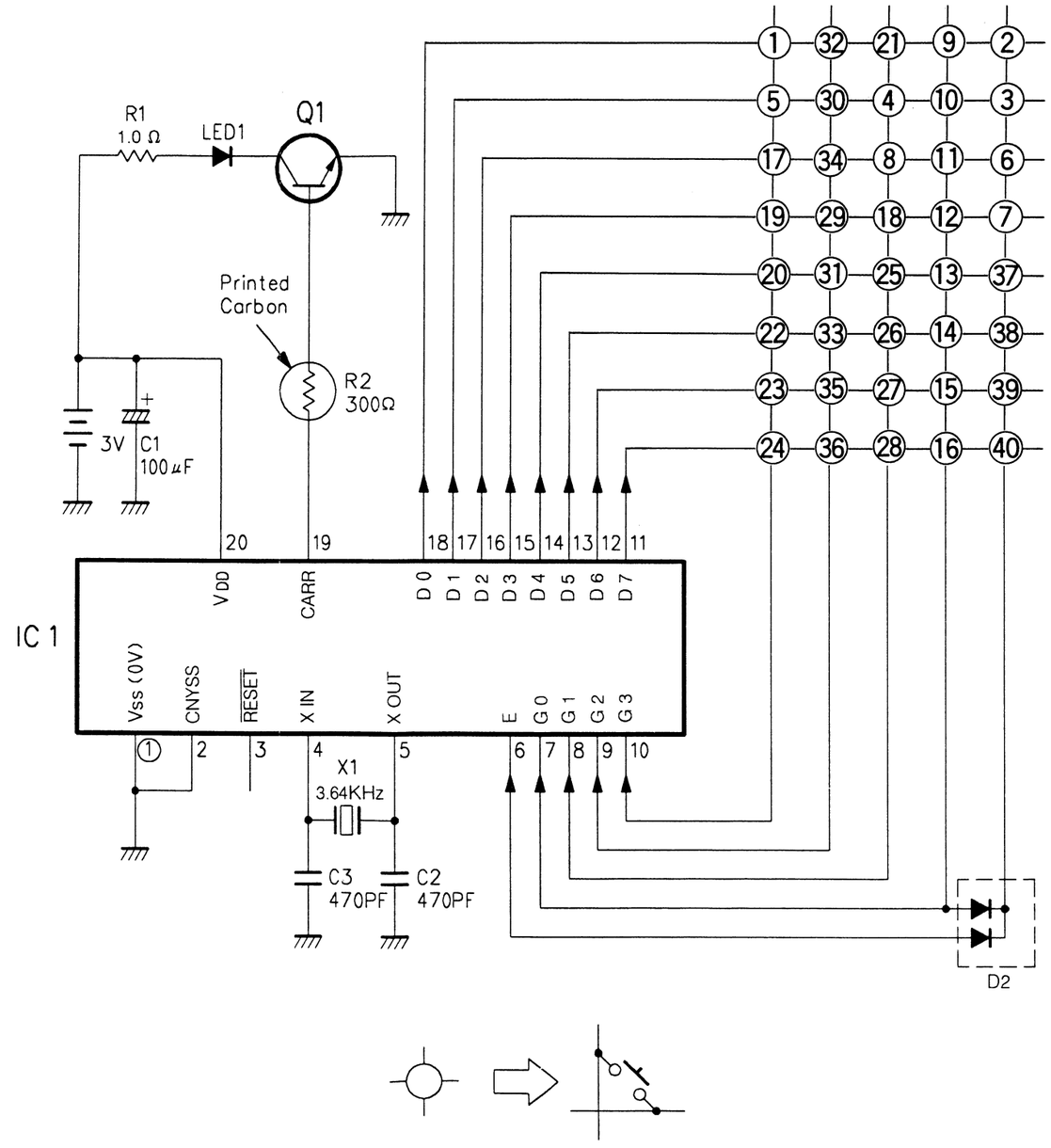


PB0.4Vp-p
20mV/5msec/DIV

4.15 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTE:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.

Key NO.	KEY NAME
1	TV / VIDEO
2	(TV/VIDEO)
3	(AUDIO)
4	POWER
5	DISPLAY
6	(TRACKING +)
7	(TRACKING -)
8	A.MONITOR
9	1
10	2
11	3
12	4
13	5
14	6
15	7
16	8
17	9
18	···/···(SP/LP)
19	0
20	TIMER
21	TV
22	CANCEL/C.RESET
23	SELECT/C.MEMORY
24	PROG/CLOCK
25	VOL.+
26	VOL.-
27	TV PROG / SET +
28	TV PROG /SET -
29	REW
30	PLAY
31	FF
32	REC
33	STOP
34	PAUSE
35	SHUTTLE PLUS ≪
36	SHUTTLE PLUS ≫
37	(TV CH +)
38	(TV CH -)
39	(TV POWER)
40	(TV VIDEO)

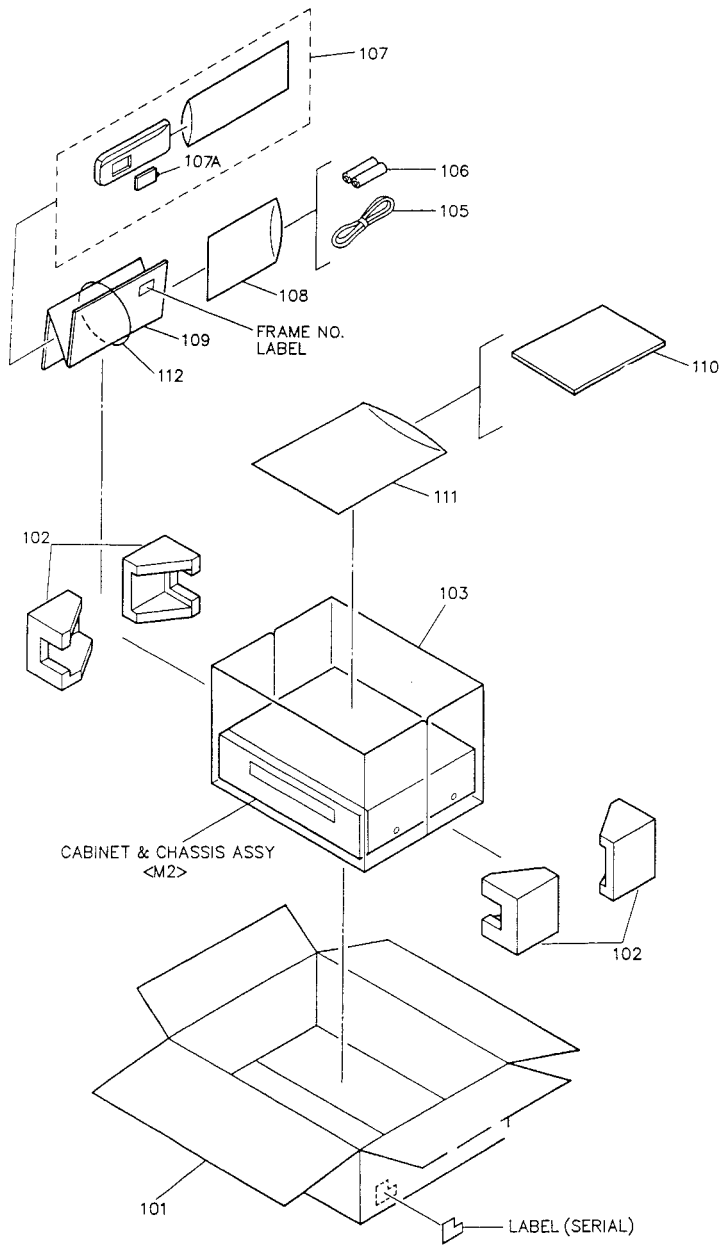


SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

5.1 PACKING AND ACCESSORY ASSEMBLY <M1>



#⚠	REF No.	PART No.	PART NAME, DESCRIPTION

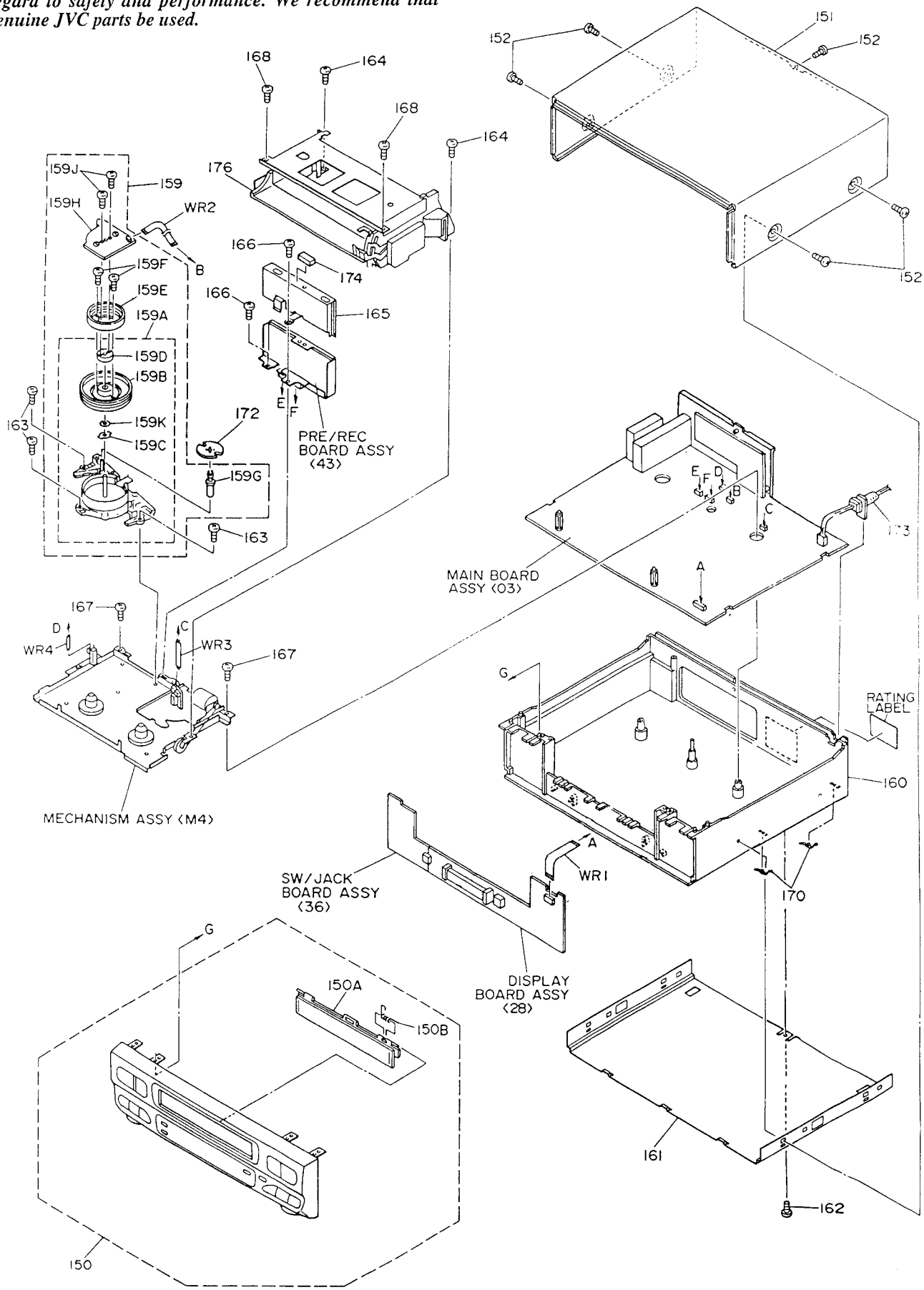
PACKING AND ACCESSORY ASSEMBLY <M1>

	101	PQ35330-15-2	PACKING CASE,J229EE
		PQ35330-16-2	PACKING CASE,J227MS
	102	PQ35331A	CUSHION ASSEMBLY
	103	PQM30021-93	POLY(FOAM)BAG
	105	PEAC0348	RF CABLE
	106	PECA0786	BATTERY,X2
⚠	107	PQ21760D-3	REMOTE CONTROLLER
	108	PQ35364	POLY BAG
	109	PQ35274-1-1	SHEET,ACCESSORY
⚠	110	PU30425-1604	INSTRUCTIONS,J229EE
⚠		PU30425-1705	INSTRUCTIONS,J227MS
	111	PQ35364-4	POLY BAG
	112	PQ46504	RUBBER BAND

5.2 CABINET AND CHASSIS ASSEMBLY <M2>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.



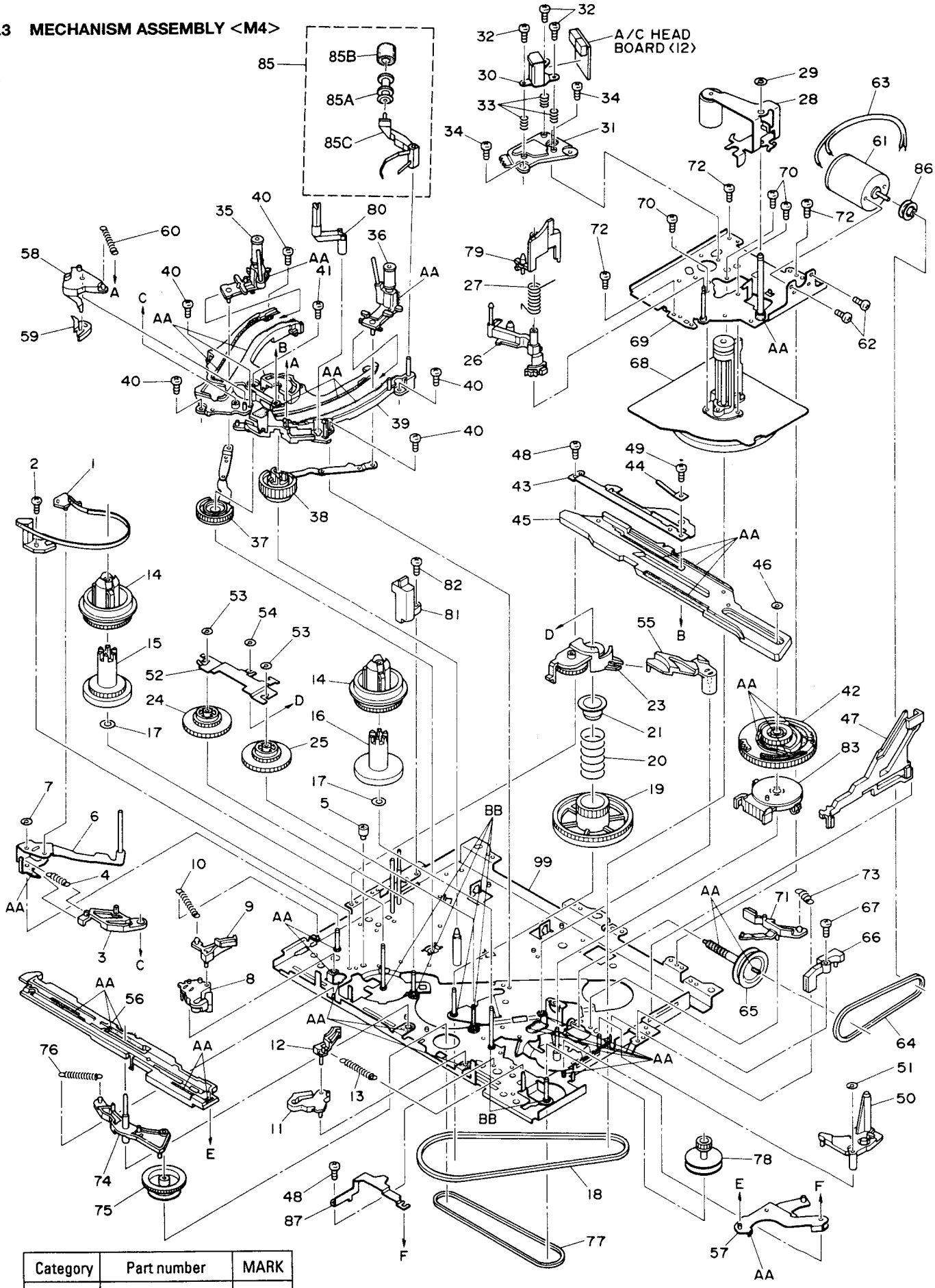
#⚠	REF No.	PART No.	PART NAME, DESCRIPTION

****

CABINET AND CHASSIS ASSEMBLY <M2>

	150	PQ11777J-4	FRONT PANEL ASSEMBLY,J229EE
		PQ11777N-4	FRONT PANEL ASSEMBLY,J227MS
	150A	PQ21778-10	CASSETTE DOOR,J229EE
		PQ21778-11	CASSETTE DOOR,J227MS
	150B	PQ46448	TORSION SPRING
⚠	151	PQ11770	TOP COVER
	152	SDSF3010M	SCREW,X5 TOP COVER
	159	PDV2348A	DRUM ASSEMBLY,J229EE
		PDV2349A	DRUM ASSEMBLY,J227MS
	159A	PDM2261H	DRUM SUB ASSEMBLY,J229EE
		PDM2261K	DRUM SUB ASSEMBLY,J227MS
	159B	PDM3353D-14	UPPER DRUM ASSEMBLY,J229EE
		PDM3353L-14	UPPER DRUM ASSEMBLY,J227MS
	159C	PDM4400A	BRUSH ASSEMBLY
	159D	PDM4345A	COLLAR ASSEMBLY
	159E	PDZ0141-2	ROTOR ASSEMBLY
	159F	SPSH2660Z	SCREW,X2
	159G	PDM4311A-1	ROLLER ASSEMBLY
⚠	159H	PDZ0141-1-2	STATOR ASSEMBLY
	159J	SPSP2606Z	SCREW,X2
	159K	PDM4050-9	WASHER
⚠	160	PQ11768-2-4	BOTTOM CHASSIS
⚠	161	PQ11769	BOTTOM COVER
	162	SDSF3006Z	SCREW,BOTTOM COVER
	163	SPST2608Z	SCREW,X3 DRUM
	164	SPST2612Z	SCREW,X2 CASS HOUSING ASSY
	165	PQ21740-1-1	SHIELD CASE(PRE)
	166	SDST2606Z	SCREW,X2 PRE
	167	SDSF4012Z	SCREW,X2 MECH
	168	SDSF3010Z	SCREW,X2 CASS HOUSING ASSY
	170	PQ46438	EARTH SPRING,X2
	172	PQ45160	INERTIA PLATE
⚠	173	QMP4A10-170	POWER CORD
	174	PQM30029-244	SPACER,PRE
	176	PUS29724B	CASSETTE HOUSING ASSEMBLY
	WR1	PW30802-0913	WIRE,FRONT
	WR2	PW30803-0422	WIRE,DRUM
	WR3	PW30101-C0HH887	WIRE,A/C HEAD
	WR4	PW30101-S0HH882	WIRE,FE HEAD

5.3 MECHANISM ASSEMBLY <M4>



Category	Part number	MARK
Grease	KYODO-SH-P	AA
Oil	COSMO-HV56	BB

NOTE: The section marked in AA and BB indicate lubrication and greasing areas.

MECHANISM ASSEMBLY <M4>

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
1	PQ46298A-3	TENSION BAND ASSEMBLY
2	SDST2608Z	SCREW
3	PQ35012	TENSION ARM LEVER
4	PQM30001-385	TENSION SPRING
5	PQ46302	ADJUST PIN
6	PQ46303A-1	TENSION ARM ASSEMBLY
7	PQM30017-47	SLIT WASHER
8	PQ46305B-3	MAIN BRAKE ASSEMBLY(SUPPLY)
9	PQ46306A-3	SUB BRAKE ASSEMBLY(SUPPLY)
10	PQM30001-393	TENSION SPRING
11	PQ46308A-2	MAIN BRAKE ASSEMBLY(TAKE UP)
12	PQ46309A-4	SUB BRAKE ASSEMBLY(TAKE UP)
13	PQM30001-389102	TENSION SPRING
14	PQ21683-1-3	REEL DISK,X2
15	PQ35014-1-3	SLIT DISK(SUPPLY)
16	PQ35015-1-1	SLIT DISK(TAKE UP)
17	PQM30018-69	SPECER,X2
18	PQM30003-33	BELT(CAPSTAN)
19	PQ46497B	PULLEY
20	PQM30002-233	COMPRESSION SPRING
21	PQ46311	SPRING CAP
22	PQM30018-69	SPACER
23	PQ46312B	IDLER ARM ASSEMNLY
24	PQ46316A-1	CLUTCH UNIT(SUPPLY)
25	PQ46323A-1	CLUTCH UNIT(TAKE UP)
26	PQ46325A-6	GUIDE ARM ASSEMBLY
27	PQ46326-1-2	TORSION SPRING
28	PQ46327A	PINCH ROLLER ARM ASSEMBLY
29	PQM30017-24	SLIT WASHER
30	PEHE0182	AUDIO/CONTROL HEAD
31	PQ35206	HEAD BASE
32	PQ43687A	SPECIAL SCREW,X3
33	PQM30002-192	COMPRESSION SPRING,X3
34	SDST2604Z	SCREW,X2
35	PQ46330A	POLE BASE ASSY(SUPPLY)
36	PQ46331A	POLE BASE ASSY(TAKE UP)
37	PQ46332A-2	LOADING ARM ASSY(SUPPLY)
38	PQ46337A-3	LOADING ARM ASSY(TAKE UP)
39	PQ11657-1-5	GUIDE RAIL
40	SPST2608Z	SCREW,X5
41	SDST2612Z	SCREW
42	PQ21684-1-3	CONTROL CAM
43	PQ35138-1-2	CONTROL BRACKET
44	PQ46423	EARTH PLATE
45	PQ11658-1-5	CONTROL PLATE
46	PQM30017-8	SLIT WASHER
47	PQ21685-2-6	PINCH PLATE
48	SPST2606Z	SCREW,X2
49	SPSF2608M	SCREW
50	PQ46342A-6	LEVER ASSY
51	PQM30017-8	SLIT WASHER
52	PQ35083-1-2	REEL BRACKET
53	PQM30017-51	SLIT WASHER,X2
54	Q03093-830	WASHER
55	PQ35026-1-2	IDLER LEVER
56	PQ11659-1-6	SLIDE PLATE
57	PQ46344A-2	CHANGE LEVER ASSEMBLY
58	PQ21686	TAKE UP LEVER ASSEMBLY
59	PQ46345	TAKE UP HEAD
60	PQM30001-387106	TENSION SPRING
⚠ 61	PU60628-3-2	MODE MOTOR
62	SPSP3003Z	SCREW,X2
63	PW30101-80AJ632	WIRE
64	PQM30003-34-17	BELT
65	PQ46395A	WORM GEAR ASSMBLY
66	PQ21699	WORM BEARING
67	SPST2606Z	SCREW
⚠ 68	PU61435	CAPSTAN MOTOR
69	PQ46347B-8	SUB DECK ASSEMBLY
70	SPSG2608Z	SCREW,X3
71	PQ46356A-1	CAPSTAN BRAKE ASSEMBLY
72	SPST2606Z	SCREW,X3
73	PQM30001-384101	TENSION SPRING,C.BRAKE
74	PQ46353A-1	CHANGE ARM ASSEMBLY
75	PQ46354	CHANGE GEAR
76	PQM30001-386	TENSION SPRING
77	PQM30003-35	BELT
78	PQ46355	CASSETTE GEAR
79	PQ35030	LID GUIDE
80	PQ21689	LED PRISM
81	PEHE0237	FULL ERASE HEAD
82	SDST2610Z	SCREW
83	PU61432-1-1	ROTARY ENCODER
85	PQ46436A-1	CLEANER ASSEMBLY
85A	PQ46418-1-2	CLEANER ROLLER
85B	PQ46419-1-2	CLEANER
85C	PQ35159-1-1	CLEANER ARM
86	PQ43546-1-2	MOTOR PULLEY
87	PQ35217-1-2	CONTROL BRACKET 2
99	PQ21680B-11	MAIN DECK ASSEMBLY

5.4 ELECTRICAL PARTS LIST

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
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MAIN BOARD ASSEMBLY <03>

PWBA	PB10931C-01	MAIN BOARD ASSEMBLY,J227MS
	PB10931D-01	MAIN BOARD ASSEMBLY,J229EE
OTH1	PQ46408-1-2	SENSOR CAP,X2 Q604 Q605
⚠ TNR1	PERF0197	TUNER UNIT
⚠ TNR2	PERF0188	IF UNIT
IC1	BA7795LS	IC
or	XRA7795LS	IC
IC201	JCP0045B-1	IC
IC202	TL8849P	IC,J227MS
	TL8850P	IC,J229EE
IC401	BU2885S	IC
or	BU2884S	IC
IC601	HD6433927B35F	QFP IC (MCU)
IC602	XLJ93LC46A	IC
or	ST93C46CB1	IC
or	AT93C46-10PC	IC
or	CAT93C46P	IC
or	93LC46/P	IC
IC603	S-80728AN-Z	IC
or	RE5VL28A	IC
or	RE5VA28A	IC
IC604	TA7291S	IC
IC605	M50253P	IC
or	BU2090	IC
IC901	AN1358	IC
or	AN6562-SG	IC
or	M5223P	IC
Q1	2SA1576(QR)	TRANSISTOR
Q2	2SA1576(QR)	TRANSISTOR
Q3	2SC4081(QR)	TRANSISTOR
Q6	DTC144WU	TRANSISTOR
or	UN521E	TRANSISTOR
Q203	2SC4081(QRS)	TRANSISTOR
Q204	2SC4081(QRS)	TRANSISTOR
Q207	2SA1576(QRS)	TRANSISTOR
Q208	2SA1576(QRS)	TRANSISTOR
Q209	2SA1576(QRS)	TRANSISTOR
Q210	DTC144EU	TRANSISTOR
or	UN5213	TRANSISTOR
Q211	DTC144EU	TRANSISTOR
or	UN5213	TRANSISTOR
Q212	2SA1576(QRS)	TRANSISTOR
Q441	2SC4081(RS)	TRANSISTOR,J227MS
Q601	2SC4081(QRS)	TRANSISTOR
Q604	PN268VI	PHOTO TRANSISTOR
Q605	PN268VI	PHOTO TRANSISTOR
Q607	DTC143EU	TRANSISTOR
or	UN521L	TRANSISTOR
Q608	DTC124EU	TRANSISTOR
or	UN5212	TRANSISTOR
Q609	DTC124EU	TRANSISTOR
or	UN5212	TRANSISTOR
Q611	DTC124EU	TRASISTOR
or	UN5212	TRANSISTOR
Q801	2SK2043-CB14	FE TRANSISTOR
or	2SK2324-LT	FE TRANSISTOR
or	2SK1953-LF	FE TRANSISTOR

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
Q802	2SC3616(ML)	TRANSISTOR
Q851	2SD2166	TRANSISTOR
Q852	2SC4081(RS)	TRANSISTOR
Q853	2SC3616(MLK)	TRANSISTOR
Q854	DTA114EU	TRANSISTOR
or	UN5111	TRANSISTOR
Q855	2SD2144S(UVW)	TRANSISTOR
Q858	2SC1740S(RS)	TRANSISTOR
or	2SC3199(GB)-TJK	TRANSISTOR
or	2SC3311A(RS)	TRANSISTOR
or	2SC536SPA(FG)	TRANSISTOR
Q860	2SA1198(SE)	TRANSISTOR
Q861	2SD1292(QR)	TRANSISTOR
Q902	2SB810H,J	TRANSISTOR
Q903	2SC3068	TRANSISTOR
Q904	2SA1576(RS)	TRANSISTOR
Q905	2SC4081(RS)	TRANSISTOR
Q906	DTC114EU	TRANSISTOR
or	UN5211	TRANSISTOR
Q908	2SA1576(RS)	TRANSISTOR
Q910	2SC4081(RS)	TRANSISTOR
Q911	DTA123YU	TRANSISTOR
or	UN511H	TRANSISTOR
Q912	DTA123YU	TRANSISTOR
or	UN511H	TRANSISTOR
Q913	DTA123YU	TRANSISTOR
or	UN511H	TRANSISTOR
Q914	DTA144TU	TRANSISTOR
or	UN5110	TRANSISTOR
D1	1N4148M	DIODE
or	MA165	DIODE
or	1SS133	DIODE
D201	1N4148M	DIODE
or	1SS133	DIODE
or	MA165	DIODE
D202	1N4148M	DIODE
or	MA165	DIODE
or	1SS133	DIODE
D203	1N4148M	DIODE
or	1SS133	DIODE
or	MA165	DIODE
D204	1N4148M	DIODE
or	MA165	DIODE
or	1SS133	DIODE
D206	1N4148M	DIODE
or	1SS133	DIODE
or	MA165	DIODE
D207	1N4148M	DIODE
or	MA165	DIODE
or	1SS133	DIODE
D601	RD9.1ES-T1B2	ZENER DIODE
D602	11ES2	DIODE
D603	1N4148M	DIODE
or	1SS133	DIODE
or	MA165	DIODE
D604	11ES2	DIODE
D605	1N4148M	DIODE
or	1SS133	DIODE
or	MA165	DIODE
D606	1N4148M	DIODE
or	MA165	DIODE
or	1SS133	DIODE

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
D607	1N4148M	DIODE
	or 1SS133	DIODE
	or MA165	DIODE
D608	11ES2	DIODE
D609	1N4148M	DIODE
	or 1SS133	DIODE
	or MA165	DIODE
D610	SIR-381SB3FM	LE DIODE
	or SIR-381SB3FX1M	LE DIODE
D801	10E6-F2	DIODE
D802	10E6-F2	DIODE
D803	10E6-F2	DIODE
D804	10E6-F2	DIODE
D808	1N4148M	DIODE
	or MA165	DIODE
	or 1SS133	DIODE
D809	UZ27BSB	ZENER DIODE
	or RD27ES-T1B2	DIODE
	or MTZ27BT-77	ZENER DIODE
D810	AU01	FR DIODE
	or ERA18-04-T2	FR DIODE
	or 1SR153-400-T2	FR DIODE
	or 10ELS4	FR DIODE
D811	AU01	FR DIODE
	or ERA18-04-T2	FR DIODE
	or 1SR153-400-T2	FR DIODE
	or 10ELS4	FR DIODE
D852	RL2Z-LFB2	FR DIODE
	or ERC30-02-L6	FR DIODE
D853	RL2Z-LFB2	FR DIODE
	or ERC30-02-L6	FR DIODE
D854	RK14LF-B2	BARRIER DIODE
	or 21DQ04	BARRIER DIODE
D855	RD15ES-T1B1	ZENER DIODE
	or UZ15BSA	DIODE
D856	RD6.2ES-T1B3	ZENER DIODE
	or MTZV6.2C	ZENER DIODE
	or UZ6.2BSC	ZENER DIODE
D857	1SS131Y	DIODE
D858	RD24ES-T1B3	ZENER DIODE
	or UZ24BSC	ZENER DIODE
D860	1SS131Y	DIODE
D861	MTZ20DT-77	ZENER DIODE
	or RD20ES-T1B3	ZENER DIODE
D862	RD5.1JSB2	DIODE
D863	1N4148M	DIODE
	or MA165	DIODE
	or 1SS133	DIODE
D864	11ES2	DIODE
D865	1SS131Y	DIODE
D866	MTZ20DT-77	ZENER DIODE
	or RD20ES-T1B3	ZENER DIODE
D867	1SS131Y	DIODE
D868	1SS131Y	DIODE
D869	1N4148M	DIODE
	or 1SS133	DIODE
	or MA165	DIODE
D870	1N4148M	DIODE
	or MA165	DIODE
	or 1SS133	DIODE
D872	1SS131Y	DIODE

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
D873	RD39ES-T1B3	DIODE	
	or UZ39BSC	DIODE	
D874	1SS131Y	DIODE	
D875	1SS131Y	DIODE	
D876	1SS131Y	DIODE	
D901	MTZ10D	ZENER DIODE	
D902	HZT31	ZENER DIODE	
D903	1N4148M	DIODE	
	or 1SS133	DIODE	
	or MA165	DIODE	
D904	1N4148M	DIODE	
	or MA165	DIODE	
	or 1SS133	DIODE	
D905	1N4148M	DIODE	
	or 1SS133	DIODE	
	or MA165	DIODE	
R1	QRD161J-393	RESISTOR	39kΩ,1/6W
R2	QRD161J-221	RESISTOR	220Ω,1/6W
R3	QRD161J-102	RESISTOR	1kΩ,1/6W
R4	QRSA08J-123YN	RESISTOR	12kΩ,1/10W
R5	QRSA08J-562YN	RESISTOR	5.6kΩ,1/10W
R6	QRSA08J-122YN	RESISTOR	1.2kΩ,1/10W
R7	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R8	QRSA08J-681YN	RESISTOR	680Ω,1/10W
R10	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R11	QRD161J-153	RESISTOR	15kΩ,1/6W
R12	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R13	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R14	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R17	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R18	QRSA08J-183YN	RESISTOR	18kΩ,1/10W
R19	QRSA08J-475YN	RESISTOR	4.7MΩ,1/10W
R21	QRSA08J-822YN	RESISTOR	8.2kΩ,1/10W
R22	QRSA08J-274YN	RESISTOR	270kΩ,1/10W
R23	QRSA08J-121YN	RESISTOR	120Ω,1/10W
R24	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R25	QRD161J-102	RESISTOR	1kΩ,1/6W
R26	QRSA08J-123YN	RESISTOR	12kΩ,1/10W
R27	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R29	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R30	QRD161J-273	RESISTOR	27kΩ,1/6W
R31	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R32	QRD161J-183	RESISTOR	18kΩ,1/6W
R33	QRD161J-820	RESISTOR	82Ω,1/6W
R34	QRSA08J-3R3YN	RESISTOR	3.3Ω,1/10W
R35	QRSA08J-123YN	RESISTOR	12kΩ,1/10W
R36	QRSA08J-822YN	RESISTOR	8.2kΩ,1/10W
R42	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10W
R43	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R201	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10W
R202	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10W
R208	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R210	QRSA08J-512YN	RESISTOR	5.1kΩ,1/10W
R211	QRSA08J-122YN	RESISTOR	1.2kΩ,1/10W
R212	QRSA08J-391YN	RESISTOR	390Ω,1/10W
R213	QRSA08J-621YN	RESISTOR	620Ω,1/10W
R214	QRSA08J-182YN	RESISTOR	1.8kΩ,1/10W
R215	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R216	QRSA08J-331YN	RESISTOR	330Ω,1/10W
R217	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R218	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R219	QRSA08J-822YN	RESISTOR	8.2kΩ,1/10W

#△ REF No.	PART No.	PART NAME, DESCRIPTION	
R220	QRSA08J-182YN	RESISTOR	1.8kΩ,1/10W
R221	QRSA08J-331YN	RESISTOR	330Ω,1/10W
R222	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R223	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R224	QRSA08J-105YN	RESISTOR	1MΩ,1/10W
R225	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R226	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R227	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R229	QRSA08J-182YN	RESISTOR	1.8kΩ,1/10W
R231	QRSA08J-561YN	RESISTOR	560Ω,1/10W
R232	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R233	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R234	QRSA08J-332YN	RESISTOR	3.3kΩ,1/10W
R235	QRSA08J-821YN	RESISTOR	820Ω,1/10W
R236	QRSA08J-681YN	RESISTOR	680Ω,1/10W
R237	QRSA08J-750YN	RESISTOR	75Ω,1/10W
R238	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R239	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R240	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R241	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R242	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R243	QRSA08J-683YN	RESISTOR	68kΩ,1/10W
R244	QRSA08J-561YN	RESISTOR	560Ω,1/10W
R245	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
R246	QRD121J-391S	RESISTOR	390Ω,1/2W
R248	QRD161J-823	RESISTOR	82kΩ,1/6W
R252	QRSA08J-332YN	RESISTOR	3.3kΩ,1/10W
R253	QRD161J-824	RESISTOR	820kΩ,1/6W
R254	QRSA08J-395YN	RESISTOR	3.9MΩ,1/10W
R255	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R256	QRSA08J-272YN	RESISTOR	2.7kΩ,1/10W
R257	QRSA08J-395YN	RESISTOR	3.9MΩ,1/10W
R401	QRSA08J-561YN	RESISTOR	560Ω,1/10W
R402	QRSA08J-561YN	RESISTOR	560Ω,1/10W
R403	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R404	QRD161J-102	RESISTOR	1kΩ,1/6W
R405	QRD161J-102	RESISTOR	1kΩ,1/6W
R406	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R407	QRSA08J-242YN	RESISTOR	2.4kΩ,1/10W
R408	QRSA08J-562YN	RESISTOR	5.6kΩ,1/10W
R409	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R410	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R411	QRSA08J-103YN	RESISTOR,J227MS	10kΩ,1/10W
R412	QRSA08J-103YN	RESISTOR,J227MS	10kΩ,1/10W
R415	QRSA08J-222YN	RESISTOR,J227MS	2.2kΩ,1/10W
R441	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R442	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R443	QRSA08J-563YN	RESISTOR	56kΩ,1/10W
R601	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R602	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R603	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R604	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R605	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R606	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R607	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R608	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R609	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R610	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R611	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R612	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R613	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R614	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W

#△ REF No.	PART No.	PART NAME, DESCRIPTION	
R618	QRSA08J-332YN	RESISTOR	3.3kΩ,1/10W
R619	QRSA08J-332YN	RESISTOR	3.3kΩ,1/10W
R622	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R623	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R624	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R625	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R626	QRD161J-102	RESISTOR	1kΩ,1/6W
R628	QRD161J-102	RESISTOR	1kΩ,1/6W
R629	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R630	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R632	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R633	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R634	QRD161J-102	RESISTOR	1kΩ,1/6W
R635	QRD161J-102	RESISTOR	1kΩ,1/6W
R638	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R639	QRD161J-101	RESISTOR	100Ω,1/6W
R640	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R641	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R642	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R643	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R644	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R645	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R646	QRSA08J-391YN	RESISTOR	390Ω,1/10W
R647	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R648	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R649	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R652	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R654	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R655	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R656	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R657	QRD161J-472	RESISTOR	4.7kΩ,1/6W
R658	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R662	QRD161J-681	RESISTOR	680Ω,1/6W
R663	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R666	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R667	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
R669	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R670	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10W
R671	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R674	QRSA08J-105YN	RESISTOR	1MΩ,1/10W
R675	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R676	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R677	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R678	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R679	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R680	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R681	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R682	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R685	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R686	QRD161J-750	RESISTOR	75Ω,1/6W
R687	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R688	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R689	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R690	QRD161J-103	RESISTOR	10kΩ,1/6W
R691	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R692	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R693	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R694	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R696	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R697	QRD161J-333	RESISTOR	33kΩ,1/6W
R698	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R700	QRSA08J-471YN	RESISTOR	470Ω,1/10W

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
R701	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R751	QRSA08J-750YN	RESISTOR	75Ω,1/10W
R801	QRD161J-224	RESISTOR	220kΩ,1/6W
R802	QRD161J-224	RESISTOR	220kΩ,1/6W
R803	QRD161J-683	RESISTOR	68kΩ,1/6W
R804	QRG029J-331A	OMF RESISTOR	330Ω,2W
R805	QRX014J-R39Z	MF RESISTOR	0.39Ω,1W
R806	QRD161J-332	RESISTOR	3.3kΩ,1/6W
R808	QRG029J-683G	OMF RESISTOR	68kΩ,2W
R810	QRD161J-224	RESISTOR	220kΩ,1/6W
R811	QRD161J-152	RESISTOR	1.5kΩ,1/6W
R812	QRD161J-222	RESISTOR	2.2kΩ,1/6W
R851	QRD161J-102	RESISTOR	1kΩ,1/6W
R852	QRV144F-3740AY	CMF RESISTOR	374Ω,1/4W
R853	QRV144F-4870AY	CMF RESISTOR	487Ω,1/4W
R854	QRD161J-122	RESISTOR	1.2kΩ,1/6W
R855	QRG02DJ-102X	OMF RESISTOR	1kΩ,2W
R857	QRG01DJ-331X	OMF RESISTOR	330Ω,1W
R858	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R859	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R860	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R861	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R863	QRSA08J-511YN	RESISTOR	510Ω,1/10W
R864	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R865	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R866	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R867	QRD161J-682	RESISTOR	6.8kΩ,1/6W
R868	QRD161J-102	RESISTOR	1kΩ,1/6W
R870	QRG01DJ-150X	MF RESISTOR	15Ω,1W
R876	QRD161J-102	RESISTOR	1kΩ,1/6W
R877	QRD161J-102	RESISTOR	1kΩ,1/6W
R901	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10W
R902	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R903	QRSA08J-331YN	RESISTOR	330Ω,1/10W
R904	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R905	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R906	QRSA08J-272YN	RESISTOR	2.7kΩ,1/10W
R907	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R908	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R909	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R910	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R916	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R920	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R921	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R922	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R923	QRSA08J-154YN	RESISTOR	150kΩ,1/10W
R924	QRSA08J-154YN	RESISTOR	150kΩ,1/10W
R925	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
R926	QRSA08J-271YN	RESISTOR	270Ω,1/10W
R927	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R928	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R930	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R932	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R934	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R935	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R936	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R937	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R938	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R939	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R940	QRSA08J-224YN	RESISTOR	220kΩ,1/10W
C2	QETC1CM-476	E CAPACITOR	47μF,16V
C3	QETF1CM-106	E CAPACITOR	10μF,16V

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
C4	QETC1HM-105	E CAPACITOR	1μF,50V
C5	QCC11EJ-682	CAPACITOR	0.0068μF,25V
C7	QCC11EJ-682	CAPACITOR	0.0068μF,25V
C8	QEKF1CM-106	E CAPACITOR	10μF,16V
C9	QCYA1EK-223	CAPACITOR	0.022μF,25V
C10	QCYA1EK-223	CAPACITOR	0.022μF,25V
C11	QEKF1AM-226	E CAPACITOR	22μF,10V
C12	QCYA1EK-223	CAPACITOR	0.022μF,25V
C13	QCYA1EK-123	CAPACITOR	0.012μF,25V
C14	QEKF1AM-336	E CAPACITOR	33μF,10V
C15	QETC1EM-475	E CAPACITOR	4.7μF,25V
C16	QCYA1HK-681	CAPACITOR	680pF,50V
C17	QCYA1HK-223	CAPACITOR	0.022μF,50V
C18	QCYA1HK-472	CAPACITOR	0.0047μF,50V
C19	QFN31HJ-823	F CAPACITOR	0.082μF,50V
C20	QETF1CM-106	E CAPACITOR	10μF,16V
C21	QCYA1HK-331	CAPACITOR	330pF,50V
C26	QCYA1HK-681	CAPACITOR	680pF,50V
C201	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C202	QCSA1HJ-330	CAPACITOR	33pF,50V
C203	QCFA1CZ-474	CAPACITOR	0.47μF,16V
C204	QCFA1CZ-474	CAPACITOR	0.47μF,16V
C205	QCFA1CZ-105	CAPACITOR	1μF,16V
C206	QEKF1EM-475	E CAPACITOR	4.7μF,25V
C207	QEKF1EM-475	E CAPACITOR	4.7μF,25V
C209	QCFA1EZ-104	CAPACITOR	0.1μF,25V
C210	QCFA1EZ-104	CAPACITOR	0.1μF,25V
C215	QCSA1HJ-181	CAPACITOR	180pF,50V
C216	QEKF1AM-226	E CAPACITOR	22μF,10V
C217	QCSA1HJ-821	CAPACITOR	820pF,50V
C219	QCSA1HJ-220	CAPACITOR	22pF,50V
C221	QCSA1HJ-680	CAPACITOR	68pF,50V
C223	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C224	QCFA1EZ-104	CAPACITOR	0.1μF,25V
C225	QCSA1HJ-100	CAPACITOR	10pF,50V
C226	QEKF1HM-225	E CAPACITOR	2.2μF,50V
C227	QCYA1EK-223	CAPACITOR	0.022μF,25V
C228	QEKF1EM-475	E CAPACITOR	4.7μF,25V
C229	QCYA1HK-222	CAPACITOR	0.0022μF,50V
C230	QEKF1HM-105	E CAPACITOR	1μF,50V
C231	QCSA1HJ-680	CAPACITOR	68pF,50V
C232	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C233	QCSA1HJ-181	CAPACITOR	180pF,50V
C234	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C235	QEPF1HM-474	NP E CAPACITOR	0.47μF,50V
C236	QETF1EM-475	E CAPACITOR	4.7μF,25V
C237	QEKF1EM-475	E CAPACITOR	4.7μF,25V
C238	QCFA1CZ-474	CAPACITOR	0.47μF,16V
C239	QETF1EM-475	E CAPACITOR	4.7μF,25V
C240	QCYA1CK-333	CAPACITOR	0.033μF,16V
C241	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C242	QCSA1HJ-750	CAPACITOR	75pF,50V
C243	QETF1HM-105	E CAPACITOR	1μF,50V
C244	QCSA1HJ-681	CAPACITOR	680pF,50V
C245	QCYA1HK-103	CAPACITOR	0.01μF,50V
C246	QCYA1HK-102	CAPACITOR	0.001μF,50V
C247	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C248	QCFA1HZ-103	CAPACITOR	0.01μF,50V
C249	QCFA1EZ-104	CAPACITOR	0.1μF,25V
C250	QCYA1CK-473	CAPACITOR	0.047μF,16V
C251	QCFA1EZ-104	CAPACITOR	0.1μF,25V
C252	QETF1HM-105	E CAPACITOR	1μF,50V

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
	C253	QETF1HM-105	E CAPACITOR 1μF,50V
	C257	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C258	QCFA1EZ-104	CAPACITOR 0.1μF,25V
	C259	QEKF1HM-105	E CAPACITOR 1μF,50V
	C260	QCFA1CZ-474	CAPACITOR 0.47μF,16V
	C261	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C262	QEKF1CM-106	E CAPACITOR 10μF,16V
	C263	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C264	QCVB1CN-103	CAPACITOR 0.01μF,16V
	C265	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C266	QCYA1HK-472	CAPACITOR 0.0047μF,50V
	C267	QETC0JM-477	E CAPACITOR 470μF,6.3V
	C268	QETF1CM-476	E CAPACITOR 47μF,16V
	C269	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C270	QCFA1HZ-103	CAPACITOR 0.01μF,50V
	C272	QCFA1EZ-104	CAPACITOR 0.1μF,25V
	C273	QEKF0JM-107	E CAPACITOR 100μF,6.3V
	C274	QEKF0JM-107	E CAPACITOR 100μF,6.3V
	C275	QCSA1HJ-560	CAPACITOR 56pF,50V
	C276	QCFA1EZ-104	CAPACITOR 0.1μF,25V
	C277	QCSA1HJ-8R0	CAPACITOR 8pF,50V
	C278	QCSA1HJ-470	CAPACITOR 47pF,50V
	C286	QCSB1HJ-220	CAPACITOR 22pF,50V
	C287	QCSB1HJ-220	CAPACITOR 22pF,50V
	C401	QCYA1HK-102	CAPACITOR 0.001μF,50V
	C403	QCYA1HK-102	CAPACITOR 0.001μF,50V
	C404	QCYA1CK-563	CAPACITOR 0.056μF,16V
	C405	QCSA1HJ-101	CAPACITOR 100pF,50V
	C406	QCFA1EZ-104	CAPACITOR 0.1μF,25V
	C407	QEKF1CM-106	E CAPACITOR 10μF,16V
	C408	QEKF1CM-106	E CAPACITOR 10μF,16V
	C409	QEKF0JM-107	E CAPACITOR 100μF,6.3V
	C410	QCFA1EZ-104	CAPACITOR 0.1μF,25V
	C413	QEKF1HM-105	E CAPACITOR 1μF,50V
	C414	QCYA1HK-102	CAPACITOR,J229EE 0.001μF,50V
	C415	QCYA1EK-123	CAPACITOR 0.012μF,25V
	C418	QCSA1HJ-181	CAPACITOR 180pF,50V
	C441	QEKF1CM-106	E CAPACITOR,J227MS 10μF,16V
	C442	QCYA1HK-103	CAPACITOR,J227MS 0.01μF,50V
	C443	QCSA1HJ-390	CAPACITOR,J227MS 39pF,50V
	C444	QCSA1HJ-470	CAPACITOR,J227MS 47pF,50V
	C445	QCSA1HJ-390	CAPACITOR,J227MS 39pF,50V
	C446	QCSA1HJ-101	CAPACITOR,J227MS 100pF,50V
	C601	QAT3120-450Z	TRIM CAPACITOR,TIMER CLOCK
	C602	QCTA1CH-180	CAPACITOR 18pF,16V
	C603	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C604	QEKF1CM-106	E CAPACITOR 10μF,16V
	C605	QCSA1HJ-270	CAPACITOR 27pF,50V
	C612	QCBB1HJ-102	CAPACITOR 0.001μF,50V
	C615	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C617	QEKF1AM-336	E CAPACITOR 33μF,10V
	C619	QETN0JM-228ZE	E CAPACITOR,BACK UP 2200μF,6.3V
	C627	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C628	QEKF0JM-107	E CAPACITOR 100μF,6.3V
	C630	QEK61CM-106	E CAPACITOR 10μF,16V
	C631	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C636	QCFA1EZ-104	CAPACITOR 0.1μF,25V
⚠	C802	QFZ9022-683	F CAPACITOR 0.068μF
⚠	C803	QFZ9022-333	F CAPACITOR 0.033μF
	C806	QETC1HM-225	E CAPACITOR 2.2μF,50V
	C808	QFV11HJ-104AZ	F CAPACITOR 0.1μF,50V
	C810	PECA0793-686	E CAPACITOR 68μF,400V

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
⚠	C811	QCZ9026-222	CAPACITOR 0.0022μF
⚠	C814	QCZ9026-101	CAPACITOR 100pF
	C815	QFLC1HJ-822Z	F CAPACITOR 0.0082μF,50V
	C816	QCBB1HJ-151	CAPACITOR 150pF,50V
	C817	QCZ0212-472	CAPACITOR 0.0047μF,1kV
	C851	QEMR1AM-107	E CAPACITOR 100μF,10V
	C853	QEM91AM-687	E CAPACITOR 680μF,10V
	C854	QEM91CM-827	E CAPACITOR 820μF,16V
	C855	QFLC1HJ-223Z	F CAPACITOR 0.022μF,50V
	C856	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C857	QFLC1HJ-183Z	F CAPACITOR 0.018μF,50V
	C859	QETF1HM-226	E CAPACITOR 22μF,50V
	C860	QETC1HM-226	E CAPACITOR 22μF,50V
	C861	QFLC1HJ-103Z	F CAPACITOR 0.01μF,50V
	C862	QFLC1HJ-102Z	F CAPACITOR 0.001μF,50V
	C863	QETF0JM-107	E CAPACITOR 100μF,6.3V
	C864	QETC0JM-226	E CAPACITOR 22μF,6.3V
	C866	QETF1CM-106	E CAPACITOR 10μF,16V
	C869	QETF1HM-474	E CAPACITOR 0.47μF,50V
	C870	QETF1CM-107	E CAPACITOR 100μF,16V
	C901	QETF1CM-336	E CAPACITOR 33μF,16V
	C902	QETC1HM-106	E CAPACITOR 10μF,50V
	C903	QEKF1HM-225	E CAPACITOR 2.2μF,50V
	C905	QCFA1HZ-223	CAPACITOR 0.022μF,50V
	C906	QETF1HM-474	E CAPACITOR 0.47μF,50V
	C911	QETC1HM-106	E CAPACITOR 10μF,50V
	C912	QFN31HJ-153	F CAPACITOR 0.015μF,50V
	C913	QFN31HJ-333	F CAPACITOR 0.033μF,50V
	C914	QCYA1HK-103	CAPACITOR 0.01μF,50V
	C915	QCYA1HK-122	CAPACITOR 0.0012μF,50V
	C916	QETF1HM-224	E CAPACITOR 0.22μF,50V
	L1	PU58308-123J	COIL 12mH
	L202	PU59152-220J	COIL 22μH
	L203	PU59152-470J	COIL 47μH
	L204	PU59152-820J	COIL 82μH
	L205	PU59152-151J	COIL 150μH
	L207	PELN0530-101JZ	COIL 100μH
	L208	PELN0530-101JZ	COIL 100μH
	L209	PU59152-100J	COIL 10μH
	L210	PELN0530-561JZ	COIL 560μH
	L211	PELN0530-101JZ	COIL 100μH
	L213	PU59152-150J	COIL 15μH
	L214	PU59152-150J	COIL 15μH
	L216	PELN0530-101JZ	COIL 100μH
	L601	PU59152-100J	COIL 10μH
	L602	PU54223-1R0J	COIL 1μH
	L603	PELN0530-100JZ	COIL 10μH
	L851	PELN0687	COIL
	L853	PELN0687	COIL
	EQ201	PELN0742	EQUALIZER,J227MS
		or PELN0877	EQUALIZER,J227MS
⚠	CF601	PEVB0497-Z	RESONATOR
⚠	X201	PEVB0617	CRYSTAL RESONATOR
⚠	X202	PEVB0581	CRYSTAL RESONATOR,J227MS
⚠		or PEVB0470-02	CRYSTAL RESONATOR,J227MS
⚠	X441	PEVB0476	CRYSTAL RESONATOR,J227MS
⚠	X601	PEVB0422	CRYSTAL RESONATOR
	S601	PESW0674	PUSH SWITCH,CASS SWITCH
	S602	PESW0589	PUSH SWITCH,REC SF SWITCH
	S701	PESW0671	SLIDE SWITCH,RF TEST SW
	S702	PESW0671	SLIDE SWITCH,RF SYSTEM
⚠	T1	PELN0832	OSC TRANSFORMER

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	K801	PELN0662-Z	FERRATE BEADS	
	K851	PELN0662-Z	FERRATE BEADS	
⚠	PC801	PS2561L-1(WL)	PH COUPLER	
	PS601	PU61433	REEL SENSOR,TAKE UP	
	PS602	PU61433	REEL SENSOR,SUPPLY	
⚠	T801	PELN1065	SW TRANS	
	T901	PELN0806	COIL	
	ETH1	PQ21623-1-2	EARTH PLATE(RF),TERM BOARD	
⚠	HS1	PQ45788-1-1	HEAT SINK,Q801	
	SCW1	SDST3006Z	SCREW,HEAT SINK OF Q801	
	SPC1	PEME0947-01-01	SPACER,X2 MECH	
	TB1	PQ35354A	TERMINAL BOARD ASSEMBLY	
⚠	FC801	PEMC0965-Z	FUSE CLIP,F801	
⚠	FC802	PEMC0965-Z	FUSE CLIP,F801	
	JA701	PU61149-3	PIN JACK,V IN/OUT	
	JA702	PU61149-2	PIN JACK,A IN/OUT	
⚠	LF801	PU59707	LINE FILTER	
	CN1	PU60727-7	CONNECTOR,(1-7)A/C HEAD J229EE	
	CN2	PU60727-2	CONNECTOR,(1-2)FE HEAD	
	CN201	PEMC1055-004	CONNECTOR,(8-11)PRE/REC	
	CN202	PEMC1055-008	CONNECTOR,(1-8)PRE/REC	
	CN402	PEMC0916-004	CONNECTOR,(1-4)DRUM MOTOR	
	CN601	PEMC1077	CONNECTOR,(1-8)CAP MDA	
	CN602	PU61434-1-1	CONNECTOR,(1-5)ROTARY ENCODER	
	CN603	PU60727-2	CONNECTOR,(1-2)LOADING MOTOR	
	CN604	PEMC0916-009	CONNECTOR,(1-9)DISPLAY	
	CN702	PEMC1119-002	PIN HEADER,BACK UP	
⚠	CN801	PU60250-2	CONNECTOR,(1-2)AC IN	
⚠	CP401	ICP-N15	CIRCUIT PROTECTOR	
⚠	CP601	ICP-N25	CIRCUIT PROTECTOR	
⚠	CP801	ICP-N20	CIRCUIT PROTECTOR	
⚠	CP802	ICP-N25	CIRCUIT PROTECTOR	
⚠	F801	QMF51E2-1R25	FUSE	T1.2A

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AUDIO/CONTROL HEAD BOARD ASSY <12>

PWBA	PB40068A	A/CTL HEAD BOARD ASSEMBLY
CN1	PU60910-107	CONNECTOR,(1-7)MAIN

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DISPLAY BOARD ASSEMBLY <28>

PWBA1	PB10919J1-01	DISPLAY BOARD ASSEMBLY,J227MS
	PB10919K1-01	DISPLAY BOARD ASSEMBLY,J229EE
IC1	UPD16311GC(P)	IC
	or UPD16311GC(E)	IC
	or UPD16311GC(K)	IC
IC2	GP1U581X	IR DETECT UNIT
	or HC-377J	IR DETECT UNIT
D1	1N4148M	DIODE
	or 1SS132Y	DIODE
D2	1N4148M	DIODE
	or 1SS132Y	DIODE
D3	1N4148M	DIODE
	or 1SS132Y	DIODE
D4	1N4148M	DIODE
	or 1SS132Y	DIODE
D6	1N4148M	DIODE
	or 1SS132Y	DIODE
D8	1N4148M	DIODE,J227MS
	or 1SS132Y	DIODE,J227MS
D9	1N4148M	DIODE,2 HEAD
	or 1SS132Y	DIODE
D11	RD3.0ES-T1B2	ZENER DIODE
D12	SLR-342VR3F	LE DIODE,OPERATE
D16	1N4148M	DIODE
	or 1SS132Y	DIODE
R1	QRD161J-333	RESISTOR 33kΩ,1/6W
R2	QRD161J-333	RESISTOR 33kΩ,1/6W
R3	QRD161J-333	RESISTOR 33kΩ,1/6W
R4	QRD161J-333	RESISTOR 33kΩ,1/6W
R5	QRD161J-472	RESISTOR 4.7kΩ,1/6W
R6	QRD161J-472	RESISTOR 4.7kΩ,1/6W
R7	QRD161J-102	RESISTOR 1kΩ,1/6W
R8	QRD161J-563	RESISTOR 56kΩ,1/6W
R9	QRD161J-103	RESISTOR 10kΩ,1/6W
R10	QRD161J-103	RESISTOR 10kΩ,1/6W
R11	QRD161J-331	RESISTOR 330Ω,1/6W
R15	QRD161J-472	RESISTOR 4.7kΩ,1/6W
R16	QRD161J-103	RESISTOR 10kΩ,1/6W
RA1	QRB045J-333F	RESISTOR ARRAY 33kΩ,4W
C1	QETF0JM-336	E CAPACITOR 33μF,6.3V
C2	QCFB1HZ-104	CAPACITOR 0.1μF,50V
C3	QETF1HM-106	E CAPACITOR 10μF,50V
C4	QCSB1HJ-330	CAPACITOR 33pF,50V
C5	QCSB1HJ-330	CAPACITOR 33pF,50V
C6	QETF0JM-227	E CAPACITOR 220μF,6.3V
S5	PESW0525-02Z	TACT SWITCH,PAUSE
S6	PESW0525-02Z	TACT SWITCH,REC/ITR
S7	PESW0525-02Z	TACT SWITCH,PLAY
S8	PESW0525-02Z	TACT SWITCH,STOP/EJECT
S13	PESW0525-02Z	TACT SWITCH,S13/14/18 COLOR S
S15	PESW0525-02Z	TACT SWITCH,STORE
S16	PESW0525-02Z	TACT SWITCH,CH SEARCH
S21	PESW0525-02Z	TACT SWITCH,S21/24 SCENE FIND
S39	PESW0525-02Z	TACT SWITCH,FF
S40	PESW0525-02Z	TACT SWITCH,REW
FDP1	PEDP0098-04	FLUORESCENT DISPLAY PANEL
HD1	PQM30038-6	LED HOLDER,FOR D12
HD3	PQ34668	FDP HOLDER(L)
HD4	PQ34669	FDP HOLDER(R)
CN1	PEMC0916-109	CONNECTOR,(1-9)MAIN
CN2	PEMC0724-006	CONNECTOR,(1-6)SW/JACK

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SWITCH/JACK BOARD ASSEMBLY <36>

PWBA2	PB10919H2	SW/JACK BOARD ASSEMBLY
S1	PESW0525-02Z	TACT SWITCH,CH +
S2	PESW0525-02Z	TACT SWITCH,CH −
S3	PESW0525-02Z	TACT SWITCH,OPERATE

#△ REF No.	PART No.	PART NAME, DESCRIPTION	
S4	PESW0525-02Z	TACT SWITCH,TIMER	
CN3	PEMC0723-006	CONNECTOR,(1-6)DISPLAY	

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PRE/REC AMP BOARD ASSEMBLY <43>

BKT1	PQ21741-1-2	SHIELD FRAME(PRE)	
PWBA	PB10926J	PRE/REC BOARD ASSEMBLY	
IC101	BA7182AS	IC	
Q1	2SC4081(QRS)	TRANSISTOR	
Q2	2SA1576(QRS)	TRANSISTOR	
Q3	2SC4081(QRS)	TRANSISTOR	
Q4	2SC4081(QRS)	TRANSISTOR	
Q8	DTA124EU	TRANSISTOR	
R1	NRSA63J-182N	RESISTOR	1.8kΩ,1/16W
R2	NRSA63J-102N	RESISTOR	1kΩ,1/16W
R3	QRD161J-681	RESISTOR	680Ω,1/6W
R4	NRSA63J-681N	RESISTOR	680Ω,1/16W
R12	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R13	NRSA63J-392N	RESISTOR	3.9kΩ,1/16W
R14	NRSA63J-392N	RESISTOR	3.9kΩ,1/16W
R15	NRSA63J-391N	RESISTOR	390Ω,1/16W
R16	NRSA63J-391N	RESISTOR	390Ω,1/16W
R17	NRSA63J-911N	RESISTOR	910Ω,1/16W
R18	NRSA63J-272N	RESISTOR	2.7kΩ,1/16W
R19	NRSA63J-122N	RESISTOR	1.2kΩ,1/16W
R20	NRSA63J-182N	RESISTOR	1.8kΩ,1/16W
R21	NRSA63J-102N	RESISTOR	1kΩ,1/16W
R22	NRSA63J-331N	RESISTOR	330Ω,1/16W
R24	QRSA08J-561YN	RESISTOR	560Ω,1/10W
R27	NRSA63J-0R0N	RESISTOR	0Ω,1/16W
R36	NRSA63J-121N	RESISTOR	120Ω,1/16W
R101	NRSA63J-103N	RESISTOR	10kΩ,1/16W
R102	NRSA63J-103N	RESISTOR	10kΩ,1/16W
R103	NRSA63J-333N	RESISTOR	33kΩ,1/16W
C1	NCF31HZ-103A	CAPACITOR	0.01μF,50V
C2	NCF31HZ-103A	CAPACITOR	0.01μF,50V
C9	NCS31HJ-330A	CAPACITOR	33pF,50V
C10	NCS31HJ-300A	CAPACITOR	30pF,50V
C11	NCF31HZ-103A	CAPACITOR	0.01μF,50V
C12	NCS31HJ-8R0A	CAPACITOR	8pF,50V
C15	NCB31HK-102A	CAPACITOR	0.001μF,50V
C31	QEKF0JM-476	E CAPACITOR	47μF,6.3V
C32	NCB31EK-103A	CAPACITOR	0.01μF,25V
C37	NCS31HJ-220A	CAPACITOR	22pF,50V
C44	NCB31CK-104A	CAPACITOR	0.1μF,16V
C45	NCS31HJ-100A	CAPACITOR	10pF,50V
C101	NCB31CK-104A	CAPACITOR	0.1μF,16V
C102	QCVB1CN-103	CAPACITOR	0.01μF,16V
C103	NCS31HJ-680A	CAPACITOR	68pF,50V
C104	NCB31CK-104A	CAPACITOR	0.1μF,16V
C105	NCB31CK-104A	CAPACITOR	0.1μF,16V
C106	NCB31CK-104A	CAPACITOR	0.1μF,16V
C107	QCYA1EK-104	CAPACITOR	0.1μF,25V
C108	QCYA1EK-104	CAPACITOR	0.1μF,25V
C109	QCYA1EK-104	CAPACITOR	0.1μF,25V
C110	NCS31HJ-390A	CAPACITOR	39pF,50V
C111	QEK60JM-476	E CAPACITOR	47μF,6.3V

#△ REF No.	PART No.	PART NAME, DESCRIPTION	
C112	QCYA1HK-103	CAPACITOR	0.01μF,50V
L3	PU59152-560J	COIL	56μH
L4	PU59152-470J	COIL	47μH
L6	PU59152-560J	COIL	56μH
L101	PU48530-101J	COIL	100μH
CN1	PU59973-4	CONNECTOR,(1-4) UPPER DRUM	
CN2	PEMC1056-104	CONNECTOR,(8-11)MAIN	
CN3	PEMC1056-108	CONNECTOR,(1-8)MAIN	

SECTION 6
TECHNICAL INFORMATION

6.1 SYSCON CIRCUIT

6.1.1 Syscon CPU pin function (IC601) 1/2

PIN NO.	LABEL	IN/OUT	NOTE
1	P. DOWN	IN	POWER DOWN DETECT (POWER DOWN:H → L)
2	PROTECT	IN	SWD5V/12V DETECT
3	S. CURVE	IN	TUNING CHECK
4	SYNC DET	IN	SYNC DETECT (NO SYNC:H)
5	AVSS	-	GND
6	TEST	-	GND
7	X2	-	TIMER CLOCK (32.768KHz)
8	X1	-	TIMER CLOCK (32.768KHz)
9	VSS	-	GND
10	OSC1	IN	SYSTEM CLOCK (10MHz)
11	OSC2	OUT	SYSTEM CLOCK (10MHz)
12	RESET	IN	RESET AT CONNECT VCR TO AC
13	(NMI)	-	NC
14	LSC	IN	MECHANISM MODE DETECT (C)
15	LSB	IN	MECHANISM MODE DETECT (B)
16	LSA	IN	MECHANISM MODE DETECT (A)
17	C. L. END	IN	CASSETTE TAPE LOAD SWITCH (CASSETTE IN: L)
18	RECSF	IN	REC SAFETY SW DETECT (SW ON:L)
19	STTS	IN	LEADER TAPE DETECT (DETECT ON:L)
20	ENDS	IN	TRAILER TAPE DETECT (DETECT ON:L)
21	R. PAUSE	IN	REMOTE PAUSE CONTROL (PAUSE ON:L)
22	TU FG	IN	TAKE-UP REEL ROTATION DET/TAPE REMAIN
23	SUP FG	IN	SUPPLY REEL ROTATION DET/TAPE REMAIN
24	P. CTL	OUT	POWER ON/OFF CONTROL (POWER ON:L)
25	SHUTTLE	-	NC
26	JSB	-	NC
27	JSA	-	NC
28	SERVO	OUT	CAPSTAN MOTOR CONTROL (SERVO:L/SYSCON:H)
29	LCM1	OUT	LOADING MOTOR DRIVE (1)
30	LCM2	OUT	LOADING MOTOR DRIVE (2)
31	HSEL	OUT	HEAD SELECT CONTROL (SP:L/LP:M/EP:H)
32	A/M/S	OUT	PRE/REC CIRCUIT CONTROL (AUTO:M/MANUAL:H/S&S:L)
33	REC ST (H)	OUT	REC START:H
34	MS/NT/PAL	OUT	MS MODE:H/NTSC MODE:L/PAL MODE:OPEN
35	3.58 (H) /4.43 (L)	OUT	NTSC 3.58MHz:H/4.43MHz:L
36	CCIR (L)	OUT	CCIR MODE:L
37	REC (H)	OUT	REC MODE:H
38	EXP DATA	OUT	EXPANDER DATA
39	COM. CLOCK	OUT	MEMORY IC DATA TRANSFER CLOCK
40	NTSC (L)	OUT	NTSC MODE:L

Table 6-1-1-A SYSCON CPU pin function (1/2)

6.1.2 Syscon CPU pin function (IC601) 2/2

PIN NO.	LABEL	IN/OUT	NOTE
41	RAE OUT	OUT	NC
42	S-DATA	OUT	SERVO IC CONTROL DATA
43	V. MUTE (L)	OUT	VIDEO MUTE:L
44	A. MUTE (H)	OUT	AUDIO MUTE:H
45	VPCTL	OUT	V. PULSE ADDITION TIMING CONTROL
46	PAUSE (L)	OUT	CAPSTAN MOTOR CONTROL (PAUSE:L)
47	CAP REV (L)	OUT	CAPSTAN MOTOR CONTROL (FWD:H/REV:L)
48	NT ON PAL	OUT	NTSC ON PAL MONITOR
49	P. MUTE (L)	OUT	PICTURE MUTE CONTROL (MUTE ON:L)
50	RC IN	IN	REMOTE CONTROL DATA INPUT
51	EE	OUT	EE MODE:L
52	CTL C/D	IN	CTL PULSE INPUT (MODE DETECT/BLANK PORTION DET)
53	V SYNC	IN	NTSC/PAL SYNC DETECT
54	M CE	OUT	MEMORY IC CHIP ENABLE
55	SECAM SUPER (H)	-	NC
56	OS CE	-	NC
57	S-OUT	OUT	ON SCREEN CONTROL DATA
58	S-IN	IN	ON SCREEN/FDP CONTROL DATA
59	S-CLK	OUT	DATA TRANSFER CLOCK
60	H DATA	OUT	VIDEO IC CONTROL DATA
61	STB	OUT	CLOCK OUTPUT PERMISSION
62	H CLK	OUT	VIDEO IC DATA TRANSFER CLOCK
63	VCC	-	SYSTEM POWER
64	NTSC SP (L)	OUT	NTSC SP MODE:L
65	M DATA	OUT	MEMORY IC DATA
66	AUX (L)	OUT	AUX MODE:L
67	CTL CLOCK	IN	INDEX CONTROL
68	PWM	OUT	CHANNEL DATA
69	CAP FG	IN	TAPE SPEED DETECT/BACK SPACE COUNT
70	DUTY I/O	IN/OUT	IN/OUT INDEX DATA CONTROL
71	D. FF	IN	DRUM ROTATION DETECT/REC TIMING CONTROL
72	AVCC	-	SYSTEM POWER (for ANALOG)
73	NC	-	NC
74	NC	-	NC
75	DRUM V	OUT	DRUM MOTOR CONTROL
76	CAP V	OUT	CAPSTAN MOTOR CONTROL
77	D. V. DET	IN	DRUM DRIVE VOLTAGE DETECT
78	6. 5H DET	IN	PB SWITCHING POINT ADJUST PULSE
79	MESECAM DET	IN	MESECAM DETECT
80	AVRG FM	IN	AUTO TRACKING DATA (AVRG VOLTAGE OF PB FM LEVEL) INPUT

Table 6-1-1-B SYSCON CPU pin function (2/2) E. & O. E. No. 82476